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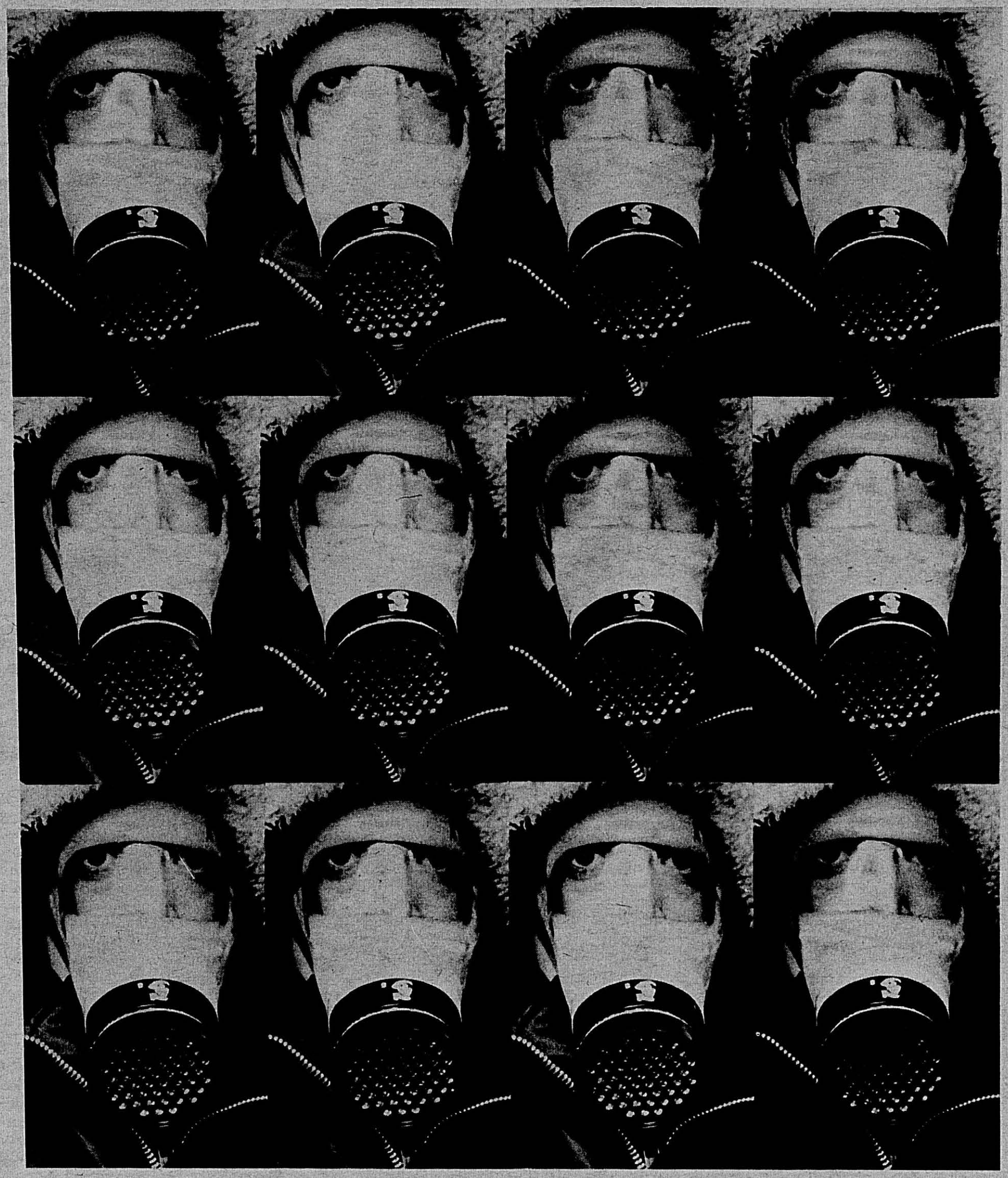

WAR AND PEACE IN THE ECOLOGICAL VILLAGE

Guest Editorial by Stuart Gilman

Two areas comprise the focus for the *McGill Reporter's* editorial attention this year: education and pollution. This issue features articles by Marcel Goldschmid, director of McGill Centre for Learning and Development; Sally Nelson, teacher at Dawson College; Monika Kehoe, visiting Professor of English at McGill; and Donald Kingsbury, lecturer in mathematics at McGill and one of McGill's foremost educational revolutionaries—all relating to education.

In "The End of the Species," we find authors Aster and Gilman (myself) announcing grim prophecies (which are quite optimistic when viewed a little closer). We do believe in a second genesis. We hint at a program for survival, something we expect to write about in the near future.

John Fisher's "Survival U" (a reprint), is an attempt to unify the themes of education and pollution. His suggestion that a university be established at which nothing is taught except insofar as it relates to the problem of survial is rather naive. We cannot imagine the feasibility nor the desirability of a group of students, teachers, and researchers huddled together on the question of survival. The idea that education should be confined to one further task of "management" seems a perversion of educational philosophy, another formulation of the American pioneer spirit, which has not done very much either for man or spirit. On the other hand, there is a good deal of substance in the problems he raises and his article deserves serious attention.

The front page of the Montreal *Gazette*, November 4th, is an excellent illustration of the anomalies of pollution control and the possibility of eco-disaster. One of the lead articles announces the federal government's decision to ban DDT, eflective January first next year. The article concludes with a warning that as a result of the ban, we should expect certain food shortages this winter. The article then goes on to soft-peddle the reasons for this. What seems clear to us is that there can be no stabilization of the human food supply without serious counter-effects. It is too early to know what these effects will be. But it seems that there will be as much irresponsibility and haste in attempts to correct certain polluting actions as there was when the pollutants were created in the first place.

On the same page of the *Gazette*. there is an article relating Canadian indignation against East German, Polish, and Russian exploitation of fish populations around Canadian coastal waters. The article points out that the communist fishing flotilla has nearly made extinct many species of fish and that many species have already become commercially valueless.

The end of the oceans, which Paul Ehrlich spoke about in the September issue of *Ramparts*, includes a discussion of the commercial plundering of the sea. The exploitation of the sea by commercial navies is more efficient than ever before. This efficiency threatens the existence of all ocean life.

Nuclear radiation, nuclear bombs, air control, herbicides, pesticides, industrial waste, phosphates—all these are international problems, requiring international agreement for their control.

Sweden has initiated the most advanced anti-pollution techniques in the world. But her air is being polluted by the winds which carry British air over her territory.

War and peace in the global village is not merely an information war, as McLuhan has pointed out (rather superficially). It is an ecological war—a war of losers.

Stuart Gilman is Associate Editor, *McGill Reporter.*

THE END OF THE SPECIES: A Tragic Progress:

by HOWARD ASTER and STUART GILMAN

One does not have to stress that atmospheric and water pollution, crude efforts at pest control, strip mining and other despoilations, have altered the land-, water-, and airspace. This is obvious to everyone. It is not a new phenomenon in the history of man. It is just that man's alteration of the environment is now taking place on an unprecedented scale at an unprecedented rate.

—P. R. Grant, "The Elements of Animal Ecology," in the *McGill Reporter,* Oct. 10, 1969

Both worldwide plague and thermonuclear war are made more probable as population growth continues. These, along with famine, make up the trio of potential "death rate solutions" to the population problem . . . Make no mistake about it, the imbalance will be redressed.

—Paul Ehrlich, "Eco-Catastrophe!" in *Ramparts,* Sept. 1969

Since the publication in September of Paul Ehrlich's grim scenario on the death of the oceans in 1979, public attention has been focussed more and more on the problems of air, sea, and land pollution. "The end of the world" has now become common coinage. The death of the oceans, predicted for 1979, is thought to be a conservative estimate. The fact is, the ocean is dying *now*, and it becomes academic to argue whether its final gasp will occur in 1979, earlier, or even a little later.

Speaking to many people about this, we sense a quiet hysteria concerning the eco-catastrophe, with its grim implications for the human species. Because of the media, no one is unaware of the problem.

The end of ocean life is not considered apart from the end of animal life in general. Global war may be the ultimate result of a world-wide food shortage, but this is a secondary consideration. Once death sets in, the precise form it takes need not be a matter of too much debate.

Since there can be no escape from a plague, no escape when the air is depleted of its oxygen and we are gasping for lack of it, no escape from the cancers which result from fibres in the air, or the common hydrocarbon pollution—there seems to be developing a feeling that we are fighting "an enemy within." This, a kind of mass paranoia, is far more serious than the fear of nuclear holocaust which was the dominant focus for social anxiety in the 1950s. It is far more serious, because many feel that nothing will be done—or can be done—to combat the problem. The air we breathe, the food we eat, the water we drink—all are infected by the various poisons we have put into them.

No Return

A consensus among the many scientists we have spoken to is that it is not too late to eliminate pollution. A concerted effort involving billions of dollars and millions of man-hours could arrest and, to a certain extent, reverse the pollution process. On the other hand, there is a general feeling that we will *not* undertake the task before it is too late. Our social and political system does not permit the kind of rational action which is necessary.

Certainly, our governments will act—when visibly we shall be dropping like flies. But the point is that we are, like the ocean, dying now, tens of millions, all around the globe, from many specific and non-specific effects of a poisoned environment. If we should begin contracting some form of plague, or if famine comes to North America, that will be the signal that our time is up. At that point, perhaps in five to ten years, it will be too late. The overt signal for the "death-rate solution"—dropping like flies—will also be the signal of no return.

Both the individual and his society reconcile themselves to natural death. Also, to unnatural death. We do so by art, religion, philosophy, song, and dance. The individual transcends the essential tragedy and pathos of human existence in terms of some ultimate good or in terms of some ulterior goal or purpose that seems to us to be meaningful. The rationalization and transcendence of death is a common element in every human society.

Rarely in the history of the human species

has it become necessary to rationalize the possible death of the species itself. Now, in view of these grim predictions, it has become necessary to begin that rationalization—to interpret the possible impending catastrophes in some way that is acceptable to the individual.

Optimism above all

Our view of social history is optimistic. We feel that human society progresses continuously, with no basic regressions. There occur, from time to time, certain superficial blows against human societies and the human race in general, but this does not alter our fundamentally optimistic view.

There are two possible futures. First, that the environmental problem will eliminate most of human life. Second, that we shall somehow solve the problems of pollution and international conflict as well as the explosion of population.

In the first case (the elimination of most human life), we think that the result will be essentially progressive and beneficial. Man's population will be reduced to some optimal minimum population level. In addition, his use of technology and knowledge, as well as the development of a new social order, will be necessarily optimized because he will be concentrating his efforts on one task: survival. Even if he has moments of leisure, these moments will be meaningful only in respect of the essential task of living, which will be to *remain alive* and to perpetuate the species. The greatest problems of contemporary society will have been solved: the quality of life, of leisure, of knowledge, of social organization, of communal participation as well as the quality of art and culture, will be higher than at any time in human history. In this sense, the plague will represent a new, rational, and more humane Genesis.

The Critical Level

In the second case, in which we discover the solutions to the major problems which beset us today, we can see no real progress being made either in the quality, meaning, or direction of human existence. The prospect of the human species doubling and doubling again, reaching hundreds of billions in a short time from now, is rather grim. Given that we can maintain our human population it is likely that we shall maintain generally the other aspects of human existence in the technetronic environment. These are: continuous leisure, absence of meaning and responsibility, powerlessness, anxiety, and so on with the appropriate cop-outs: drugs, suicide, madness, loneliness. Eventually, a critical level would be reached where sheer probability would effect the essential destruction of human life, achieving exactly what the plague would achieve if we did nothing in the first place.

In the end, we feel that there is really little choice about the direction of the future. To solve problems like pollution, war, radiation, would require a direct attack on the foundations of our society—a revolution. A successful revolution. The conditions which exist today are the direct result of a centuries-long tradition which is rooted in competition (not cooperation), destruction (not rational creation), and exploitiation. There has never been anything truly just or rational in this tradition. There is little evidence to suggest that we can now "revolt," since we have not the minds nor the bodies for it—neither the education, the philosophy, nor the necessary faith that a "revolution" can be effective.

Human society will progress. If to do so it must, first of all, shed billions of its number, it will do it.

An Inescapable Process

It seems that we are engaged in an inescapable process leading to world famine—at the least. At the most, nuclear war, which would be the result of international tensions arising from differences in death rates and resources. In either case the result will be the deaths of hundreds of millions of human beings.

In the early sixties, we saw a last attempt at North American efforts to defend human life against nuclear war. A program was announced for fall-out shelters that would accommodate every person on the continent. But it never came to pass. It was proved that there is no possible way to avoid the destructive effects of nuclear war. Hysteria gave way to apathy. The expression was, and is, "If it happens, it happens, there's nothing to be done, so let's not worry." Stanley Kubrik's *Dr. Strangelove* was the perfect (and perverse) expression of our psychological acceptance of nuclear war. We became stoics, all of us.

A recent TV program showed that air pollution has forced many persons to leave our cities because they had developed various ailments caused by it. Parents recognize that allowing their children to grow up in a poisoned environment is irresponsible. The idea that a parent is, by neglect, allowing his child to be poisoned by the atmosphere causes many parents a great deal of anxiety. Yet so far, we know of a mere handful who have done anything about it. Perhaps a program needs to be formulated so that the general population will have something to refer to, to use, specifically, for their survival.

Conclusion

A feeling of helplessness pervades all aspects of individual and social action in the technological society. There will be little attempt to build pollution shelters, except, of course, by the very rich and the politicians. If there is panic, it is controlled. On the other hand, we expect that there will be mass hysterical manifestations within three years or so. Today, however, business is as usual, even as life runs out.

SURVIVAL U:
Prospectus for a really relevant University

by JOHN FISHER

It gets pretty depressing to watch what is going on in the world and realize that your education is not equipping you to do anything about it.—From a letter by a University of California senior

She is not a radical, and has never taken part in any demonstration. She will graduate with honors, and profound disillusionment. From listening to her—and a good many like-minded students at California and East Coast campuses—I think I am beginning to understand what they mean when they say that a liberal-arts education isn't relevant.

They mean it is incoherent. It doesn't cohere. It consists of bits and pieces which don't stick together, and have no common purpose. One of our leading Negro educators, Arthur Lewis of Princeton, recently summed it up better than I can. America is the only country, he said, where youngsters are required "to fritter away their precious years in meaningless peregrination from subject to subject...spending twelve weeks getting some tidbits of religion, twelve weeks learning French, twelve weeks seeing whether the history professor is stimulating, twelve weeks seeking entertainment from the economics professor, twelve weeks confirming that one is not going to be able to master calculus."

These fragments are meaningless because they are not organized around any central purpose, or vision of the world. The typical liberal-arts college has no clearly defined goals. It merely offers a smorgasbord of courses, in hopes that if a student nibbles at a few dishes from the humanities table, plus a snack of science, and a garnish of art or anthropology, he may emerge as "a cultivated man"—whatever that means. Except for a few surviving church schools, no university even pretends to have a unifying philosophy. Individual teachers may have personal ideologies—but since they are likely to range, on any given campus, from Marxism to worship of the scientific method to exaltation of the irrational (à la Norman O. Brown), they don't cohere either. They often leave a student convinced at the end of four years that any given idea is probably about as valid as any other—and that none of them has much relationship to the others, or to the decisions he is going to have to make the day after graduation.

Education was not always like that. The earliest European universities had a precise purpose: to train an elite for the service of the Church. Everything they taught was focused to that end. Thomas Aquinas had spelled it all out: what subjects had to be mastered, how each connected with every other, and what meaning they had for man and God.

Later, for a span of several centuries, Oxford and Cambridge had an equally clear function: to train administrators to run an empire. So too did Harvard and Yale at the time they were founded; their job was to produce the clergymen, lawyers, and doctors that a new country needed. In each case, the curriculum was rigidly prescribed. A student learned what he needed, to prepare himself to be a competent priest, district officer, or surgeon. He had no doubts about the relevance of his courses—and no time to fret about expanding his consciousness or currying his sensual awareness.

This is still true of our professional schools. I have yet to hear an engineering or medical student complain that his education is meaningless. Only in the liberal-arts colleges—which boast that "we are not trade schools"—do the youngsters get that feeling that they are drowning in a cloud of feathers.

For a long while some of our less complacent

academics have been trying to restore coherence to American education. When Robert Hutchins was at Chicago, he tried to use the Great Books to build a comprehensible framework for the main ideas of civilized man. His experiment is still being carried on, with some modifications, at St. John's—but it has not proved irresistibly contagious. Sure, the thoughts of Plato and Machiavelli are still pertinent, so far as they go—but somehow they don't seem quite enough armor for a world beset with splitting atoms, urban guerrillas, nineteen varieties of psychotherapists, amplified guitars, napalm, computers, astronauts, an atmosphere polluted simultaneously with auto exhaust and TV commercials.

Another strategy for linking together the bits-and-pieces has been attempted at Harvard and at a number of other universities. They require their students to take at least two years of survey courses, known variously as core studies, general education, or world civilization. These too have been something less than triumphantly successful. Most faculty members don't like to teach them, regarding them as superficial and synthetic. (And right they are, since no survey course that I know of has a strong unifying concept to give it focus.) Moreover, the senior professors shun such courses in favor of their own narrow specialities. Consequently, the core studies which are meant to place all human experience—well, at least the brightest nuggets—into One Big Picture usually end up in the perfunctory hands of resentful junior teachers. Naturally the undergraduates don't take them seriously either.

Any successful reform of American education, I am now convinced, will have to be far more revolutionary than anything yet attempted. At a minimum, it should be:

1. Founded on a single guiding concept—an idea capable of knotting together all strands of study, thus giving them both coherence and visible purpose.

2. Capable of equipping young people to do something about "what is going on in the world"—notably the things which bother them most, including war, injustice, racial conflict, and the quality of life.

Maybe it isn't possible. Perhaps knowledge is proliferating so fast, and in so many directions, that it can never again be ordered into a coherent whole, so that molecular biology, Robert Lowell's poetry, and highway engineering will seem relevant to each other and to the lives of ordinary people. Quite possibly the knowledge explosion, as Peter F. Drucker has called it, dooms us to scholarship which grows steadily more specialized, fragmented, and incomprehensible.

The Soviet experience is hardly encouraging. Russian education is built on what is meant to be a unifying ideology: Marxism-Leninism. In theory, it provides an organizing principle for all scholarly activity—whether history, literature, genetics, or military science. Its purpose is explicit: to train a Communist elite for the greater power and glory of the Soviet state, just as the medieval universities trained a priesthood to serve the Church.

Yet according to all accounts that I have seen, it doesn't work very well. Soviet intellectuals apparently are almost as restless and unhappy as our own. Increasing numbers of them are finding Marxism-Leninism too simplistic, too narrowly doctrinaire, too oppressive; the bravest are risking prison in order to pursue their own heretical visions of reality.

Is it conceivable, then, that we might hit upon another idea which could serve as the organizing principle for many fields of scholarly inquiry; which is relevant to the urgent needs of our time; and which would not, on the other hand, impose an ideological strait jacket, as both ecclesiastical and Marxist education attempted to do?

Just possibly it could be done. For the last two or three years I have been probing around among professors, college administrators, and students—and so far I have come up with only one idea which might fit the specifications. It is simply the idea of survival.

For the first time in history, the future of the human race is now in serious question. This fact is hard to believe, or even think about—yet it is the message which a growing number of scientists are trying, almost frantically, to get across to us. Listen, for example, to Professor Richard A. Falk of Princeton and of the Center for Advanced Study in the Behavioral Sciences:

> The planet and mankind are in grave danger of irreversible catastrophe...Man may be skeptical about following the flight of the dodo into extinction, but the evidence points increasingly to just such a pursuit. ...There are four interconnected threats to the planet—wars of mass destruction, overpopulation, pollution, and the depletion of resources. They have a cumulative effect. A problem in one area renders it more difficult to solve the problems in any other area....The basis of all four problems is the inadequacy of the sovereign states to manage the affairs of mankind in the twentieth century.

Similar warnings could be quoted from a long list of other social scientists, biologists, and physicists, among them such distinguished thinkers as Rene Dubos, Buckminster Fuller, Loren Eiseley, George Wald, and Barry Commoner. They are not hopeless. Most of them believe that we still have a chance to bring our weapons, our population growth, and the destruction of our environment under control before it is too late. But the time is short, and so far there is no evidence that enough people are taking them seriously.

That would be the prime aim of the experimental university I'm suggesting here: to look seriously at the interlinking threats to human existence, and to learn what we can do to fight them off.

Let's call it Survival U. It will not be a multiversity, offering courses in every conceivable field. Its motto—emblazoned on a life jacket rampant—will be: "What must we do to be saved?" If a course does not help to answer that question, it will not be taught here. Students interested in musicology, junk sculpture, the Theater of the Absurd, and the literary dicta of Leslie Fielder can go somewhere else.

Neither will our professors be detached, dispassionate scholars. To get hired, each will have to demonstrate an emotional commitment to our cause. Moreover, he will be expected to be a moralist; for this generation of students, like no other in my lifetime, is hungering and thirsting after righteousness. What it wants is a moral system it can believe in—and that is what our university will try to provide. In every class it will preach the primordial ethic of survival.

The biology department, for example will point out that it is sinful for anybody to have more than two children. It has long since become glaringly evident that unless the earth's cancerous growth of population can be halted, all other problems—poverty, war, racial strife, uninhabitable cities, and the rest—are beyond solution. So the department naturally will teach all known methods of birth control, and much of its research will be aimed at perfecting cheaper and better ones.

Its second lesson in biological morality will be: "Nobody has a right to poison the environment we live in." This maxim will be illustrated by a list of public enemies. At the top will stand the politicians, scientists, and military men—of whatever country—who make and deploy atomic weapons; for if these are ever used, even in so-called defensive systems like the ABM, the atmosphere will be so contaminated with strontium 90 and other radioactive isotopes that human survival seems most unlikely. Also on the list will be anybody who makes or tests chemical and biological weapons—or who even attempts to get rid of obsolete nerve gas, as our Army recently proposed, by dumping the stuff in the sea.

Only slightly less wicked, our biology profs will indicate, is the farmer who drenches his land with DDT. Such insecticides remain virulent indefinitely, and as they wash into the streams and oceans they poison fish, water fowl, and eventually the people who eat them. Worse yet—as John Hay noted in his recently published *In Defense of Nature*— "The original small, diluted concentrations of these chemicals tend to build up in a food chain so as to end in a concentration that may be thousands of times as strong." It is rapidly spreading throughout the globe. DDT already has been found in the tissues of Eskimos and of Antartic penguins, so it seems probable that similar deposits are gradually building up in your body and mine. The minimum fatal dosage is still unknown.

Before he finished this course, a student may begin to feel twinges of conscience himself. Is his motorcycle exhaust adding carbon monoxide to the smog we breathe? Is his sewage polluting the nearest river? If so, he will be reminded of two proverbs. From Jesus: "Let him who is without sin among you cast the first stone." From Pogo: "We have met the enemy and he is us."

In like fashion, our engineering students will learn not only how to build dams and highways, but where *not* to build them. Unless they understand that it is immoral to flood the Grand Canyon or destroy the Everglades with a jetport, they will never pass the final exam. Indeed, our engineering graduates will be trained to ask a key question about every contract offered them: "What will be its effect on human life?" That obviously will lead to other questions which every engineer ought to comprehend as thoroughly as his slide rule. Is this new highway really necessary? Would it be wiser to use the money for mass transit—or to decongest traffic by building a new city somewhere else? Is an offshore oil well really a good idea, in view of what happened to Santa Barbara?

Our engineering faculty also will specialize in training men for a new growth industry: garbage disposal. Americans already are spending $4.5 billion a year to collect and get rid of the garbage which we produce more profusely than any other people (more than five pounds a day for each of us). But unless we are resigned to stifling in our own trash, we are going to have to come up with at least an additional $835 million a year.* Any industry with a growth rate of 18 per cent offers obvious attractions to a bright young man—and if he

*According to Richard D. Vaughn, chief of the Solid Wastes Program of HEW, in his recent horror story entitled "1968 Survey of Community Solid Waste Practices."

can figure out a new way to get rid of our offal, his fortune will be unlimited.

Because the old ways no longer work. Every big city in the United States is running out of dumping grounds. Burning won't do either, since the air is dangerously polluted already—and in any case, 75 per cent of the incinerators in use are inadequate. For some 150 years Californians happily piled their garbage into San Francisco Bay, but they can't much longer. Dump-and-fill operations already have reduced it to half its original size, and in a few more decades it would be possible to walk dry-shod from Oakland to the Embarcadero. Consequently San Francisco is now planning to ship garbage 375 miles to the yet-uncluttered deserts of Lassen County by special train—known locally as "The Twentieth Stenchery Limited" and "The Excess Express." The city may actually get away with this scheme, since hardly anybody lives in Lassen County except Indians, and who cares about them? But what is the answer for the metropolis that doesn't have an unspoiled desert handy?

A few ingenious notions are cropping up here and there. The Japanese are experimenting with a machine which compacts garbage, under great heat and pressure, into building blocks. A New York businessman is thinking of building a garbage mountain somewhere upstate, and equipping it with ski runs to amortize the cost. An aluminum company plans to collect and reprocess used aluminum cans—which, unlike the old-fashioned tin can, will not rust away. Our engineering department will try to Think Big along these lines. That way lies not only new careers, but salvation.

Survival U's Department of Earth Sciences will be headed—if we are lucky—by Dr. Charles F. Park, Jr., now professor of geology and mineral engineering at Stanford. He knows as well as anybody how fast mankind is using up the world's supply of raw materials. In a paper written for the American Geographical Society he punctured one of America's most engaging (and pernicous) myths: our belief that an ever-expanding economy can keep living standards rising indefinitely.

It won't happen; because, as Dr. Park demonstrates, the tonnage of metal in the earth's crust won't last indefinitely. Already we are running short of silver, mercury, tin, and cobalt—all in growing demand by the high-technology industries. Even the commoner metals may soon be in short supply. The United States alone is consuming one ton of iron and eighteen pounds of copper every year, for each of its inhabitants. Poorer countries, struggling to industrialize, hope to raise their consumption of these two key materials to something like that level. If they should succeed—and if the globe's population doubles in the next forty years, as it will at present growth rates—then the world will have to produce, somehow, *twelve times* as much iron and copper every year as it does now. Dr. Parks sees little hope that such production levels can ever be reached, much less sustained indefinitely. The same thing, of course—doubled in spades—goes for other raw materials: timber, oil, natural gas, and water, to note only a few.

Survival U, therefore, will prepare its students to consume less. This does not necessarily mean an immediate drop in living standards—perhaps only a change in the yardstick by which we measure them. Conceivably Americans might be happier with fewer automobiles, neon signs, beer cans, supersonic jets, barbecue grills, and similar metallic fluff. But happy or not, our students had better learn how to live The Simpler Life, because that is what most of them are likely to have before they reach middle age.

To help them understand how very precious resources really are, our mathematics department will teach a new kind of bookkeeping: social accounting. It will train people to analyze budgets—both government and corporate—with an eye not merely to immediate dollar costs, but to the long-range costs to society.

By conventional bookkeeping methods, for example, the coal companies strip-mining away the hillsides of Kentucky and West Virginia show a handsome profit. Their ledgers, however, show only a fraction of the true cost of their operations. They take no account of destroyed land which can never bear another crop; of rivers poisoned by mud and seeping acid from the spoil banks; of floods which sweep over farms and towns downstream, because the ravaged slopes can no longer hold the rainfall. Although these costs are not borne by the mining firms, they are nevertheless real. They fall mostly on the taxpayers, who have to pay for disaster relief, flood-control levees, and the resettlement of Appalachian farm families forced off the land. As soon as our students (the taxpayers of tomorrow) learn to read a social balance sheet, they obviously will throw the strip miners into bankruptcy. Another case study will analyze the proposal of the Inhuman Real Estate Corporation to build a fifty-story skyscraper in the most congested area of midtown Manhattan. If 90 per cent of the office space can be rented at $12 per square foot, it looks like a sound investment, according to antique accounting methods. To uncover the true facts, however, our students will investigate the cost of moving 12,000 additional workers in and out of midtown during rush hours. The first (and least) item is $8 million worth of new city buses. When they are crammed into the already clogged avenues, the daily loss of man-hours in traffic jams may run to a couple of million more. The fumes from their diesel engines will cause an estimated 9 per cent increase in New York's incidence of emphysema and lung cancer; this requires the construction of three new hospitals. To supply them, plus the new building, with water—already perilously short in the city—a new reservoir has to be built on the headwaters of the Delaware River, 140 miles away. Some of the dairy farmers pushed out of the drowned valley will move promptly into the Bronx and go on relief. The subtraction of their milk output from the city's supply leads to a price increase of two cents a quart. For a Harlem mother with seven hungry children, that is the last straw. She summons her neighbours to join her in riot, seven blocks go up in flames, and the Mayor demands higher taxes to hire more police....

Instead of a sound investment, Inhuman Towers now looks like criminal folly, which would be forbidden by any sensible government. Our students will keep that in mind when they walk across campus to their government class.

Its main goal will be to discover why our institutions have done so badly in their efforts (as Dr. Falk put it) "to manage the affairs of mankind in the twentieth century." This will be a compulsory course for all freshmen, taught by professors who are capable of looking critically at every political artifact, from the Constitution to the local country council. They will start by pointing out that we are living in a state of near-anarchy, because we have no government capable of dealing effectively with public problems.

Instead we have a hodgepodge of 80,000 local governments—villages, townships, counties, cities, port authorities, sewer districts, and special purpose agencies. Their authority is so limited, and their jurisdictions so confused and overlapping, that most of them are virtually impotent. The states, which in theory could put this mess into some sort of order, usually have shown little interest and less competence. When Washington is called to help out—as it increasingly has been for the last thirty-five years—it often has proved ham-handed and entangled in its own archaic bureaucracy. The end result is that nobody in authority has been able to take care of the country's mounting needs. Our welfare rolls keep growing, our air and water get dirtier, housing gets scarcer, airports jam up, road traffic clots, railways fall apart, prices rise, ghettos burn, schools turn out more illiterates every year, and a war nobody wants drags on and on. Small wonder that so many young people are losing confidence in American institutions. In their present state, they don't deserve much confidence.

The advanced students of government at Survival U will try to find out whether these institutions can be renewed and rebuilt. They will take a hard look at the few places—Jacksonville, Minnesota, Nashville, Appalachia—which are creating new forms of government. Will these work any better, and if so, how can they be duplicated elsewhere? Can the states be brought to life, or should we start thinking about an entirely different kind of arrangement? Ten regional prefectures, perhaps, to replace the fifty states? Or should we take seriously Norman Mailer's suggestion for a new kind of city-state to govern our great metropolises? (He merely called for New York City to secede from its state; but that isn't radical enough. To be truly governable, the new Republic of New York City ought to include chunks of New Jersey and Connecticut as well.) Alternatively, can we find some way to break up Megalopolis, and spread our population into smaller and more livable communities throughout the continent? Why should we keep 70 per cent of our people crowded into less than 2 per cent of our land area, anyway?

Looking beyond our borders, our students will be encouraged to ask even harder questions. Are nation-states actually feasible, now that they have power to destroy each other in a single afternoon? Can we agree on something else to take their place, before the balance of terror becomes unstable? What price would most people be willing to pay for a more durable kind of human organization—more taxes, giving up national flags, perhaps the sacrifice of some of our hard-won liberties?

All these courses (and everything else taught at Survival U) are really branches of a single science. Human ecology is one of the youngest disciplines, and probably the most important. It is the study of the relationship between man and his environment, both natural and technological. It teaches us to understand the consequences of our actions—how sulfur-laden fuel oil burned in England produces an acid rain

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THE MONTREAL FREE SCHOOL AND DAWSON COLLEGE

by SALLY NELSON

Dawson College Library: open stacks, carpets on the floor, no guards, the honour system.

Critical moments in the development of new institutions come at periodic—and predictable—intervals. Such a moment has come to both of Montreal's newest institutions, Dawson College and The Montreal Free School. The parents and teachers of The Free School met recently to try to reach some agreement regarding the teaching and administration of the school. At Dawson, the cut-off date was reached for submitting briefs to the Commission set up to receive and analyze suggestions as to how the College will be run.

The first serious hardening of discontent within Dawson came on several fronts. One concerned the disorder attendant on the continuing renovation of the building. This clearly has affected the teaching process negatively. Also, the lack of a clear organizational structure is resulting in infuriatingly ill-considered fiats by individuals. An article in *The Montreal Star* seemed to imply that Dawson's education consists of watching models at work and that its students' comments on even this activity are singularly inept. And a Dawson "put-down" in a local student underground paper implied that, to the Marxist student, Dawson's teachers were uncomfortably trying to fit an image of "super-teach" with peace symbols, palsmanship, and two inches of new beard, and that liberalism ill-became such "over-aged teeny-boppers."

At the Free School, parents criticized both the lack of orderly structure and the "cult of personality" in which increasingly fewer parents were involved in decision-making.

The problems that have arisen in the two institutions in the month or so that they have been running are surprisingly similar in their nature, and have arisen in much the same contexts. (Sociologists now doing research at Dawson on the evolution of institutions might well find a comparative study at the Free School productive.) The inevitable adjustment between ideals and reality, the snap decision-making, the personality clashes exacerbated by the need for co-operative effort, and the ideological differences hardening as the "honeymoon phase" erodes with time—all are expected problems of any new institution. But they are compounded by the notion of a "free school" at the School, and by the notion of "community" at the College. How much order and structure ought a "free" school have? How can important decisions be made at all without the active participation of the whole "community" at Dawson?

At the Free School, the problems are both easier to solve and simpler in their nature, if only because of the School's size. If an individual feels that there are unsolved problems, he can call a meeting of all of the parents and teachers. Everyone can fit into one room and quarrel vigorously until some consensus is reached. At the recent meeting, a lively time was had by all. The parents are a highly articulate, educated, and individualistic group (many teach at local schools and universities), and the meeting was a verbally civilized free-for-all. Feelings as well as ideologies were brought out. The results are that parents' committees have been set up to deal with the various administrative and practical orderly problems that had arisen, and the teachers were given a vote of confidence in their teaching.

The Free School now has about 25 students (it would like 35) and it is stable financially. There are three full-time teachers (it would like four) and there are a large number of part-time teachers—some are parents, and some are teachers, artists, and theatre people in Montreal interested in the School. The ages of the children range from 4 to 12. (Next year it will be 4 to 13.) The evolution of a high school is foreseen, but not for some time. At the moment the School, which is ungraded, will prepare students to leave the School ready to enter Grade 9. The children are divided into two groups for group teaching. When the child's work can't be done effectively with a group he works individually with a teacher. The children are happy. Academically, without tests, grade-levels, or marks to make teaching uniform and competitive, the child's progress is individual and as rapid as possible.

At Dawson, the problems are both more complex and more difficult to solve because of the size of the College. There are 2,000 students and staff, but also the representative "outside community" and parents, to consider as part of Dawson's "community." There is no place at Dawson that would hold 2,000 people even if it were believed that functional discussions could take place among 2,000 people. Both Dawson and the Free School opened without predetermined structures and envisioned organizational structures and policies evolving out of a framework of participatory democracy. Both began the school year in buildings that were, at best, evolving structures as well. The Free School is still accumulating furniture, books, and chalk to add to its Salvation Army conglomeration, but is quiet and peaceful. Study is easy. The most self-evident educational hazard at Dawson is noise. Jack-hammers, drills, creaking scaffolds, and traffic are the background, and frequently, the foreground to learning until now.

The five initial "outside community" members of Dawson's Board of Governors (established last December) deliberately allowed

the College's, and even their own operating by-laws, to remain unstructured until the whole College would be able to help in such decisions. So did the administrators (hired last December), and the faculty (meeting together since last March), until the students were available. And so did the interim student association (meeting all summer), until *all* of the students were available this fall. A Commission was set up (⅓ faculty, ⅓ students, ⅓ non-teaching staff of *all* categories) to co-ordinate and organize suggestions from the 2,000 members of the community, for running, structuring, and organizing the College. Some 40 briefs were received, some from individuals, some from "departmental groups," some solely on governing bodies and organization of "departments"; some on specific policy matters. The Commission will shortly present a report on the various forms of structure suggested to the College. By means of group meetings and referenda, the College will establish its general structure of decision-making bodies and establish basic operating policies. However necessary this delay may have been in order to produce a democratic consensus, it has produced two predictable and regrettable side-effects. One is that in order to operate at all, certain decisions had to be, and are being, made (and were made, quite without any general consultation), on an ad hoc basis, by individuals. The other is that the "honeymoon" period at the beginning of any administration or group organization was allowed to pass before the final decisions were arrived at, so that compromise will be more difficult in November or December than it would have been in September or October. (Even the heretofore uncritical admiration for the clearly exceptional abilities of the Director-General Paul Gallagher is now seen as, in the one highly critical brief, the "present cult of personality" that ought to end forthwith.)

The briefs are interesting as a group, and interesting largely in their surprising unanimity. One might have expected 2,000 people, who have not all yet met each other and have not been under the influence of the same institutional environment for more than two months, to have more diverse concepts of college government. In all of the briefs there is only one, from a member of the German Department, that stands apart from the mainstream. It advocates traditional hierarchical structures, with the final powers resting in very small groups at the top on which no students would sit. In the other briefs the question is not whether *students* will sit on the Academic Council or in the "departments" (they are by law already slated to sit on the Board of Governors), but whether *administrators* and non-teaching staff will sit with the students and faculty on governing bodies. The recent Commission on University Government report from the University of Toronto, regarding a proposed restructuring of the governing of the institution, fits the mood of the Dawson briefs exactly.

A number of Dawson teachers were teaching at McGill, some at other CEGEPs or high schools. To a large extent the last two years at McGill seem to have created many of the democratic safeguards proposed by those teachers in their briefs. The limitation of powers in the various briefs, for example, is clearly set. Safeguards such as open meetings are stressed, most briefs envision parity for students on all governing bodies, and administrators are seen as carrying out policy originated by faculty and students with the advice but not the vote of the administrators.

In the meantime the College functions, and does so with surprising good grace considering the re-building and the ad hoc arrangements. Classes seem to be learning, the vital decisions are made (there are a great many meetings held to make this possible). Student organizations, Radio Dawson, a paper, an association, sports, and clubs are underway.

The library is perhaps the present symbol of the Dawson ideal in operation. The Library stretches over most of one floor at Dawson, in two large open areas. The reference section and periodicals section are in one half, ordinary stacks in the other. Study tables and carrels are scattered in both areas among the stacks which are open stacks. There are unnumbered exits and entrances, none are guarded, most are out of the sight of the Library staff. Lending privileges are for one month and renewable, periodicals are lent, reference books may be lent under special circumstances overnight. There are small seminar rooms for group study and discussion. Checking out of books is done at a central desk, and obviously the whole system rests on an honour system that assumes that kleptomania can be kept to a budgetary amount smaller than the rental of guards. The atmosphere of the Library is extremely attractive. The floors are carpeted, the students are studying quietly, there are over 400 periodicals on open shelves in an open area, and so far it seems economically feasible as the loss-rate is lower than anticipated.

If Dawson as a whole can achieve its ideal of "community" as well as this, the adjustment between the ideal and reality need not be too onerous. A student transfer from one of the other CEGEPs still doesn't believe Dawson. He said recently "Why, at this time last year we were all on strike." Dawson hopes to avoid such events.

Sally Nelson teaches English at Dawson College.

IMPROVING THE LEARNING ENVIRONMENT AT THE UNIVERSITY

by MARCEL L. GOLDSCHMID

Forgetting for the moment the problems of the world outside and what the university would do about them let us concentrate on the university itself. Its teaching. What it teaches. How it teaches. The amount of attention, encouragement, and inspiration a student gets. The amount of time that a teacher spends with his students or in work more or less directly related to his teaching . . . the evidence as I see it gathering from an enormous number of sources indicates that there is plenty of room for improvement across the board.

—Dr. H. Rocke Robertson,
Principal of McGill University,
in *McGill News,* 1969

Student dissatisfaction with university education, particularly at the undergraduate level, has reached crisis proportions. Seemingly ever increasing numbers of students deplore and decry mass lectures, outdated teaching methods, and irrelevant course content. At the same time, tangible encouragement offered to faculty for high-quality teaching and for developing efficient learning methods has never been adequate and there are few signs of change. Rewards continue to be reserved almost exclusively for discipline-related research contributions.

In recent years, activists at McGill—both students and faculty—have attempted to deal with this crisis by advocating and aggressively pursuing structural and educational changes in the university (for example, the drive to have student representation in university government and Donald Kingsbury's Project in Course Design) and generally demanding educational reform. In response to these demands the Senate, in 1967, established the Department of Higher Education whose functions were to include educational planning and research as well as initiation of innovations in teaching methods. For a variety of reasons, this department never began its operations. In June 1969, Senate decided to replace the Department of Higher Education with the present Centre for Learning and Development (CLD). Articles in the *McGill Reporter* and in the *McGill Daily* as well as our first Newsletter have outlined the purpose and plans of the CLD. Here we would like to offer some concrete suggestions aimed at making learning more effective and creating a more viable and exciting learning environment. Only a broad outline is presented here. In further communications the CLD staff will pursue these issues in more detail.

Objectives of the Course

It is absolutely essential that each instructor clearly think through and communicate the objectives of his course to his students. At present, students are in most instances given only a vague idea (usually in the form of a rough topical course outline) of what the course will cover. The professor typically does not tell his students what he expects them to learn and why. It is as if he did not know himself, or if he does, he keeps it a secret until the exam. In every other endeavour, it is accepted that the objectives have to be made explicit. For example, when a professor applies for a research grant, he must take great care to spell out the general and specific objectives of his research and indicate what methods he will use to reach these objectives. Why can't the same procedures be applied to teaching? It is critical for the learner to know what he is supposed to learn so he can focus his efforts on the task at hand. At the same time, the instructor must explain how the course relates to other courses given in the same department and elsewhere, why its content should be taught, what role it might play in the student's general education and his life, and what particular interest and

background the instructor has in the field. Such a personal and professional context will encourage students to relate what they are learning to the discipline as a whole, to themselves, and to their environment. Too much of what now is offered in our courses amounts only to isolated pieces of information, which students are at a loss to integrate into a meaningful whole. Much of this material is therefore quickly forgotten.

Besides explicitly stating what concepts and facts the student is supposed to acquire and understand, it would be helpful to state objectives in *behavioral* terms. The question raised here is, "what do I want my students to be able to *do* at the end of the course?" as opposed to "what do I want my students to *know*?" We are usually aiming at a change in the student's behaviour which will not only facilitate optimal performance in a given task, but will also increase his motivation and ability to learn. With the rapid production of new knowledge, it has become essential that we enhance the student's capacity and interest to learn well beyond a particular course and university education.

Active versus Passive Learning Methods

The presence of large numbers of students and small numbers of professors seemingly condemns us to use teaching methods which force students to sit passively in large lecture courses and record the professor's monologue. For a number of reasons there seems little doubt that the lecture as a *routine* and *preponderant* teaching method is ineffective. Worse, it may even be destructive because it encourages passive receptivity rather than active discovery. In a lecture, students typically have no opportunity to exchange ideas, to challenge the professor, to ask questions, to suggest problems for analysis and to evaluate their personal knowledge and information. Faced with such negative aspects of the lecture system and given the fact that viable alternatives exist, why do professors persist in giving lectures? The answer, I believe, lies in the fact that most professors have not been trained to understand the learner, the learning process, and the learning environment, nor are they informed about more effective learning systems. It is typically assumed that a professor who has earned a Ph.D. degree knows how to teach, since he knows his subject matter. In the face of the evidence, we must reject this assumption.

Information and training in course design, and instructional techniques emphasizing active learning which aims at problem-solving and critical thinking, must be made available to staff and students. Effective learning systems which integrate different subject areas and provide for quick feedback and reinforcement must eventually replace the fragmented series of largely unrelated courses. Continuous experimentation, assessment, and modification are necessary to bring about such systems. We must adopt the same scientific and scholarly approach to teaching and learning we have towards our other academic pursuits.

We also have to recognize that no *one* method will prove effective for *all* students. Preliminary results from several research studies suggest that the use of different teaching methods geared to individual differences among students is more successful than one single approach. It may be possible to engineer a learning system which allows students to choose among different learning options in order to learn the course material. In such a system, a variety of learning methods could be optimally matched with student characteristics including personality, prior learning, interests and aspirations.

Mutual and Continuous Feedback

At present, the student receives little or no feedback concerning his performance in class until the semester is over. If there is only a final examination or one term paper, the student is unable to evaluate his strengths and weaknesses during the course. Nor does he typically find out, after the course, which areas he comprehended well and what concepts he failed to grasp. It is a well-validated psychological principle that to optimally shape a person's behavior he must receive continuous feedback and reinforcement for his performance. Clearly, then, evaluations of students which are frequent and distributed over the entire course are much better suited to make learning effective. These evaluations must, however, allow the student to correct his behavior, i.e., the feedback must be specific and content-related rather than just a better grade or percentage.

On the other hand, the professor should also seek continuous feedback from his students. A critique of the professor's effectiveness at the end of the course, say, in form of the course guide, will not help the students in that particular class.

Even if the class is very large, the instructor, with the help of his teaching assistants and the students, could at the beginning of the term organize a representative group of class members. This group would serve as liaison between students and staff and provide regular feedback to the instructor and the assistants throughout the year. Such feedback should serve to optimally shape the behavior of the staff, to make them responsive to the needs of the students, and to improve their method of teaching and communication. The professor should not only invite, but actively seek, honest and representative evaluation of his performance. While he may be an expert in his own discipline, he may be unaware of some of the deficiencies in his teaching. Chances are excellent that a professor who communicates a sincere interest in and makes channels available for honest feedback will receive constructive suggestions. Those who ignore and inhibit such feedback are likely to continue ineffective teaching practices.

What I am advocating is a system of partnership. Professors should be senior and students junior partners in the enterprise of learning and seeking knowledge. We must not set ourselves up as opposing forces, but instead try to cooperate with each other. Learning and the learning environment would benefit immeasureably if we actively sought continuous, objective, and mutual feedback aimed at shaping each other's performance.

Evaluation and Examinations

As already stated, evaluations must be distributed over the entire year in order to be effective. The system of final examinations is one of the worst features of current teaching practices. Even if other exams or term papers precede it, it is typically weighted in such a way as to make the student's performance on the other assignments inconsequential. The final exam concept must be de-mystified. Far from being an effective device, it too often destroys the behaviors we seek to shape. In the weighted final exam system, students are encouraged to cram in the last minute, as opposed to learning continuously throughout the year. It creates undue anxiety and short-term retention, not to speak of the practical difficulties of not having access to books in the library because of heavy demands at examination time. It is futile to blame the students for failing to organize themselves and learning from the beginning. Every year this sad phenomenon recurs. The professors who use the final exam system must take the responsibility for encouraging ineffective learning methods.

It is also essential that evaluations, besides being frequent and providing clear feedback, be in line with the objectives of a course. Exams, term papers, student presentations, and so on, must give an indication of and measure as accurately as possible whether the objectives are being reached. Too often evaluations are unrelated to the kinds of behaviors instructors profess to encourage. Rote-learning and short-term memory are emphasized at the expense of critical thinking, problem-solving, effective use of resources, and creative analysis.

Cooperation versus Competition

One of the most critical components in the University's environment are the students' peers. At present our administrative structures and teaching methods typically do not facilitate cooperation among students; they frequently impede it. The competitive spirit fostered at the university often prevents students from sharing their knowledge and helping each other in the learning process. Our learning environment would be significantly improved, if students were officially encouraged to work together on assignments. Students could even be evaluated in terms of group efforts. Professors who have experimented with the group learning approach have reported very promising results.

We should also provide upper-level undergraduate students formal opportunities to teach lower-level students and give course credits for this work. It is well known that one of the best ways to learn is to teach. It should also be remembered that many of the modern learning methods require mutual cooperation among students. Given our large classes, if learning is to be an active participatory process, students will have to depend more and more on each other for stimulation and information. A very beneficial side-product of such cooperation would be an increasing emotional bond between students who often feel alienated and isolated in the mass-university.

The Reward System and Faculty Roles

The recommendations just made are intended to be concrete and practical. If accepted in principle, they could be implemented immediately. The present reward system and current faculty role conceptions must be re-examined and redefined in order to encourage and facilitate the development of a more meaningful learning environment.

The university stresses both teaching and research, but the primary criteria for hiring and promotion, which far outweigh other considerations, are research and publications in one's own discipline. Even if a physics, English, or math instructor reports his *educational* experiments, it usually "doesn't count" because it is not considered to be research in his discipline. As a result, many professors who are keenly interested in instructional innovation are reluctant to commit a major portion of their time to educational experimentation. They are fearful that such efforts will jeopardize their career.

This orientation must change if McGill is serious about fulfilling its responsibilities towards its thousands of undergraduates. I am not advocating that we stress teaching to the exclusion of research. Rather, what we must strive for is a better balance between the two critical functions of the university. Our official

policy must include not only tangible rewards for discipline-related research, but also for high-quality teaching, educational experimentation, and the design of new learning systems. There also must be officially recognized mechanisms for enforcing this policy throughout the university, particularly on the departmental level. Creating an exciting and effective learning environment is a vital activity and must receive concrete and visible encouragement and support.

If more effective learning systems are to replace our lecture courses, the role of the professor may change considerably, particularly in the large undergraduate courses. Instead of a "teacher" who lectures to hundreds of students each week, he becomes a creator and organizer of an effective learning environment. He must use not only his knowledge of his subject matter, but also information about the learner and the learning process in order to design and run a viable operation. Donald Kingsbury has advocated on many occasions the use of "design teams," who together with professors and teaching assistants would engineer effective learning systems. As he has pointed out, such an approach requires experimentation and analysis and continuous adaptation and modification. In order to enable an instructor to redesign his courses, it may well be necessary to grant him a "study-leave" or short sabbatical.

The establishment of the Centre for Learning and Development and the Instructional Communications Centre, as well as the $100,000 Educational Development Fund, are clear indications that McGill is committed to change and is seeking to create a more viable learning environment. Possibilities now exist to implement creative proposals and to move towards better teaching strategies. Progress in educational reform, however, would be greatly enhanced, if educational experimentation received the tangible recognition it so much deserves and needs.

Mr. Goldschmid is the Director of the Centre for Learning and Development.

A MATHEMATICS LEARNING CENTER: For Educational Revolution

by DONALD KINGSBURY

We have 6,000 mathematics students in our kingdom. They harvest the wheat with scythes and thrash out the chaff with sticks, and grind the wheat between stones late into the night. Only in May when the summer sun comes, do you see our math students laughing and rolling in the grass with their fair maidens. Good peasants they are, uncomplaining of their hard and meager life, grateful for the odd boar's foot thrown into their stew, sullen perhaps, but not given to insolence like the thievish peasants of some yonder kingdoms. One can hardly expect a noble light in the eyes of such ox-like folk. But I am not among those who attribute their dullness to base birth. They spend long hours to gain little and their gruel lacks the spice by which the mind is stimulated to thought and manly action.

For reasons I cannot account and ledger, they move my pity whenever I have an idle moment. I am the youngest son of the feudal lord. I sit among the tapestries that keep the walls warm, and the fire in the hearth is extravagant, and I tear apart meat steeped in Indies spices, and there are dancing girls and jocund knights to keep me company. Why should I be rich and our math students so wretched?

My thoughts tonight are upon a child of math I met while upon horseback in the village, an empty faced child with bloated belly who will for certain grow up to be nothing but a knave. My brothers say, "God wills it so. Pray brother; put your mind at rest with thoughts of the glory of God."

And I kneel and pray before my crucifix but see only in the tortured face of Christ a math student trying to understand the epsilons and deltas of the limit definition.

Quebec gave me a small purse for a year's travel and meditation. I took myself far away to the Southern Empire in a giant airplane with howling pods on the wings. I studied with Brethower and Rummler and Markle. There was much to be learned. I went to the far sea and talked with many people. It all settled on me slowly.

Only now am I ready to act on behalf of the peasants. I am convinced of the rightness of my proposals. This is what must be done.

Necessities

1. Any project to improve the learning conditions of the math students must be started on a small pilot-plant scale, and run on a pilot-plant scale until the major problems introduced by the changes are so well understood that a larger program can be initiated with the certainty of success.

2. Courses which have a linear syllabus that starts in September and ends in April must be abolished in the project. There is no evidence that students (or staff) can make a rational decision in September about mathematical needs for a full year. There is evidence that a linear sequence over which the student has no control destroys motivation, interest, competence, and initiative.

3. To maximize the learning/effort ratio, evaluation must occur whenever the student requests it and credit must be given for effort the instant competence is reached.

4. There must be a continuous advice service which adequately matches students needs to subject material. A student must be free to change his math goals at any time, as new circumstance or experience dictates.

5. Teaching material should be constantly under revision by learning materials engineers, the revision being based on feedback from student failures. This will ensure that the operation becomes progressively more economical as the project ages.

Operation Of The Learning Center

A student who chooses to acquire his math through the Mathematics Learning Center does not register for any math courses in September. There won't be any courses to register for.

He trundles down to the MLC when a math mood hits him and discusses his case with the consultant on duty. Different students may want very different things.

He may be a graduate student in experimental medicine who has avoided mathematics all his life only to discover (with horror) that all the papers in his field require math. The consultant will look over the papers, identify the mathematical concepts involved, and suggest a set of MLC packages that will put the doctor in business as soon as possible.

The student may have math needs relevant to another course. This is very common with engineering and science students. The MLC staff would have gone over the course in question with the professor in charge and assembled a list of covering packages.

The student might be someone turned on by problem-solving. The consultant would help him locate packages which challenged his particular motivation.

The student might be marginally interested in math, with not even enough use for it to fill up half a course. He may be involved with art history and have discovered projective geometry and its influence on renaissance art. The consultant would give him the package on renaissance projective geometry, he'd do the same experiments that the ancient painters did and probably be delighted. That might be all the mathematics he'd ever want at university.

The student might be just generally curious—not enough to commit himself to a course—and the consultant could give him a sampling of packages to try on for size.

The possible variations are endless.

The Package

What is this package that the Center hands to each of the students? The package gives a rough description of the math it covers, which should never involve more than a week's worth of work. It lists relevant chapters from several books that the staff has selected, books which are on the shelves. These may include validated instructional material. Unfortunately little of this exists at the moment. The package will also list relevant film clips, displays, or models. It may include supplementary material developed by the Center. It contains a set of covering problems.

The student takes this package, rounds up the books he needs, and sits down to study. When he gets hung-up, he either discusses his problem with another student or with the consultant. The consultant makes a detailed note of each hang-up and files it in a big file for the particular package that caused the trouble, and then straightens out the student and sends him back to study.

When the study is complete the student goes to the secretary and picks up a test, which is a sub-set of a master test. If the test indicates competence, the associated fractional credit is put on the student's record and he picks up another package or terminates his study for awhile. If he fails the test, he picks up a deficiency diagnosis and returns to his studying and tries again.

If he really needs a lot of math or is in a strong math mood he can do some heavy studying and in a month earn one or two or three credits. Inside the present structure of three-

hours-per-week-final-exam-in-May this kind of naturally paced learning is impossible.

Physical Layout

The MLC is located with its own permanent floor space. There won't be any blackboards on the walls, only bookshelves. There will be some booths to show short dynamic film clips. A lot of mathematical concepts require a dynamic display to be understood and 95 per cent of our students do not have the neural machinery to create dynamic displays in their heads. Most of the needed film clips can be photographed from a computer display screen.

There may be other minor display facilities like simple 3-D still projectors. It would be convenient to have some solid mathematical models that the student can handle—like a special cube from which he can demonstrate to himself that the rotations of a cube form a group which is non-commutative. Some concepts which cause terrible trouble when we attempt to display them on a blackboard are grasped readily in the presence of a model.

Some small programmable desk computers might be useful but a definite need for them would have to be established before they were bought.

The basic floor space of the Center would contain tables like in a pub, with a flow plan that allows easy circulation so that students are encouraged to get up and talk to one another. The subject package which any student is studying should be identifiable visually—perhaps by an overhang device—so that the student at the Center can, without having to ask, be aware of the material on which every other student is working. This will facilitate students who wish to discuss some math hang-up with other students who are into the same thing.

In another area of the room you will have the consultant's base with the resources he needs.

The Consultant

The consultants will be recruited from among the graduate and honors math students and be paid. They will not act as teachers—the students will teach themselves—the consultants will be used to give advice, deblock problems, correct tests, detect operational flaws.

Their behaviours will be well specified by the Center staff. Each new consultant will be trained by a staff member or an experienced consultant.

He will talk to a new student and make an accurate assessment of the area of math which can be most profitably tackled in terms of the packages that the Center has to offer. If no package exists to fill this need, it will be the duty of the consultant to assign the student to the design team while new packages are made up.

The consultant will tutor but only after a student has been unable to understand the materials provided by the package and has be unable to get another student to explain away the hang-up. Several minutes per question is usually all the time that is required for this type of tutoring.

The consultant will get great training for his Ph.D. orals this way. He will never know what question the student will ask or from which part of mathematics it will come. And so he will have to learn how to articulate answers which will satisfy a confused mind.

The consultant will make a formal report on each hang-up he handles, a coherent statement of the problem which will satisfy the members of the design team in charge of software revision.

The consultant will process whichever parts of the tests have to be hand-corrected, and make up a deficiency diagnosis for the failures.

Credit

The present university game is to accumulate credits. This is because our managerial structures attach all the rewards to the credits rather than to the knowledge. Eventually this system has to change. However, at the moment, it would be a strategic mistake to abolish the credit system.

The students' motivational structures are conditioned to respond to credits. If knowledge doesn't have credit sauce on it, the vast majority of them won't eat it. Therefore the students will have to be weaned away from dependence upon credits before a non-credit system will "take."

Administrative problems require knowledge measures. The credit system is the best we have and cannot be discarded without administrative disasters until a better knowledge measure is created.

In spite of this, the credit system can be modified to eliminate its worst consequences. The MLC utilizes such a modified system.

Credits can now be accumulated only in January and May. Why? To be most effective they should be given out as soon as they are earned. You can triple student productivity by making that simple innovation.

The smallest credit given at McGill is half a unit. One unit is normal. Imagine trying to buy a five cent cigar or a seventy-six cent tie in a society where the smallest change is a fifty cent piece. The MLC gives out fractional credits. Each coherent mathematical unit will have credit attached to it roughly proportional to its value and learning effort at a "price" comparable to the present system. For example, a student might earn 0.06 credits for learning how to sketch the derivative of a graphically represented function.

One of the great drawbacks of the credit system is that credit is given for marginal effort. In Math 224 a student can get one credit for a 55% mark on the final exam. This system actually creates students with marginal minds. If you get paid off for sloppy-think you learn sloppy-think.

So the MLC will set competence standards for each of its math packages. No credit will be given for anything less than competence. You get a first class or zero on your test and you can take the test over until you pass. Naturally each package will have associated with it many different tests of the same abilities.

No records will be kept of failures so the constant examining will produce no anxiety.

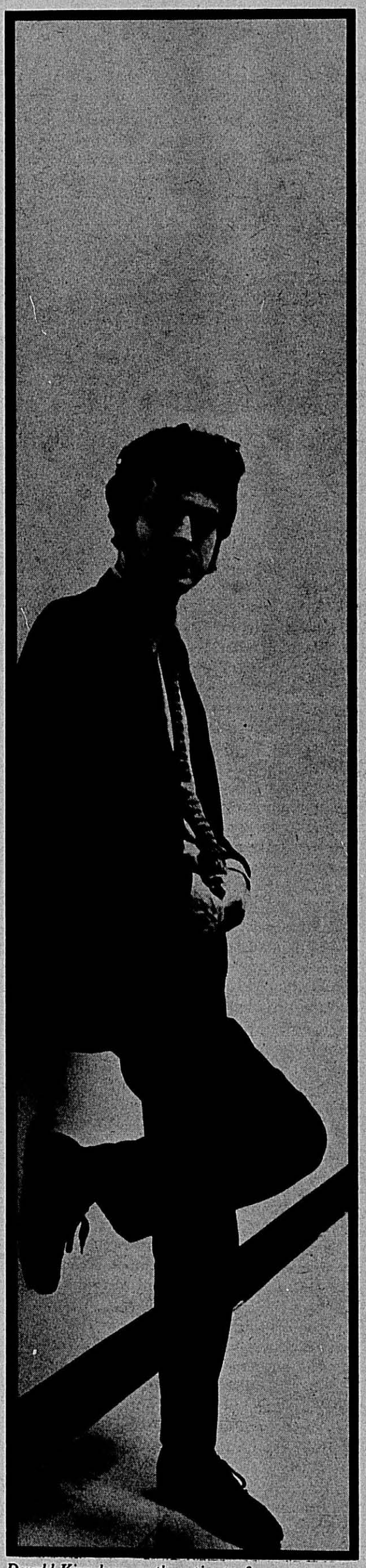
Students who are used to bell-curve courses—the bell curve distribution of marks means that the teaching was random—tend to be terrified of learning where a first class is the passing mark, but soon become enthusiastic, even amazed, when they find that they are quite capable of first-class work.

The Center keeps a file on each student, listing the credits he has earned and the package for which it has been earned. No credit is given for a package duplicated in a Math-Department course passed by the student.

These credits are eventually submitted to the central files. The fractional credit system would, of course, force an overhaul of the long obsolete transcript filing format.

Testing

When a student feels he has mastered the package content he asks the secretary for a test. As I have said, we are testing for competen-



Donald Kingsbury, mathematics professor, proposes a revolutionary learning center where information is attractive, accessible, and relevant.

ce—not grading students by gravel size—and so the test is a first class or nothing affair.

Test refinement has to be continuous and will be the responsibility of the design team. The dangers in a test are: (1) overtesting—asking the student to know things which weren't taught, (2) understanding—asking the student less than we really want.

All test failures are returned to the student in a diagnostic format which pinpoints his deficiencies.

Three testing methods are possible—an individual test may use all three or only one:

1. Oral: the consultant asks questions and evaluates the answers.

2. Written: the consultant corrects the test from a master answer sheet.

3. IBM: many—not all—math concepts can be tested by computer.

Eventually the MLC should have a computer terminal for its testing service. The student enters his answers. The computer recalls the program associated with that test, does an analysis of the student's work to see which abilities correspond to the rightly answered question and which abilities correspond to the wrongly answered question and then prints out for the student: either (1) test passed, or (2) a list of the concepts which the student has not mastered.

The Design Team

In back of all this apparatus, we have our design team of professional mathematicians and learning materials engineers. They are responsible for making up the package content, and the tests, for making decisions about which mathematics is relevant and which isn't, and what is the best available treatment of a given subject. One of their main functions will be the designing of the new learning software.

Mathematics texts are incredibly badly written from a learning point of view though they are much better than the average mathematics lecture. It will not be possible for the MLC to correct this situation immediately. You start from where you are. So the Center will first depend upon the kind of books which are available from the publishers. The packages will direct the students to study from the appropriate sections of these books.

However, the MLC will immediately set up design procedures so that materials which are learner oriented will always be in the process of development. I mentioned before that when a student gets hung-up he has available to him the help of a consultant, and that the consultant makes a specific note of the hang-up and files it. Other material, like student scrap work, may also be collected and filed.

The design team will pick one package to work on at a time. With the aid of the hang-up notes and using Gilbertian methods of organizing content into learnable formats, a new package will be designed and introduced. The automatic revision of this material will continue until it is flaw-free.

As the packages become more effective instruments the workload on the consultants will decrease, allowing a gradual lowering of the staff to student ratio. Thus the Center will become more efficient economically as the quality of its teaching increases. A rough measure of its effectiveness will be credits granted per dollar spent, a readily measurable quantity.

A by-product of the design team will be a set of learner oriented math textbooks so superior to what is now on the market that they will make a significant dent in the multi-million dollar math textbook market. As an incentive to the design staff I propose that they should share in any royalties which might come from publication of the packages.

The Pilot Project

The learning system which I have outlined here will work because it is an assembly of components which have been tested out thoroughly in many different contexts. However, it is not possible to implement such a service for 6,000 students in one year. Detailed procedures have to be worked out and learned by the staff: (1) a strategy for organizing the subject matter, (2) an information retrieval system, (3) methods for identifying and correcting deficiencies, (4) instructional objectives and criterion instruments, (5) training procedures for staff, (6) systems compatability with the ongoing university, (7) Etc.

The first year the MLC should service no more than 100 students. Enrollment would increase as the problems give way to smoothly functioning solutions. Perhaps 400 students could be handled the second year, perhaps 1,000 the third year.

Administration

The administrative apparatus of the Mathematics Learning Center should be independent of the present Mathematics Department. There are several reasons for this. Mathematics at McGill is at present a knowledge monopoly. If that monopoly had demonstrated its ability to meet consumer needs, if it had shown an ability to innovate, to keep abreast of the Twentieth Century, then I could see the MLC operating within its management structures. But the fact is that it has operated like monopolies always act—it has given McGill's math students Russian shoes to wear. The MLC couldn't survive inside the Mathematics Department. The whole mental set of their management procedures would destroy it. However, joint appointments between the MLC and the Math Department should be allowed and the MLC should give priority to hiring Math Department graduate and honors students as consultants.

Nothing could be better for the health of the Mathematics Department than to have it operate in competition with the MLC.

During at least the development phase the director of the MLC should know both mathematics and learning systems. He should be given a crack administrative assistant (not necessarily a mathematician) to relieve him of the details managers are better equipped to handle.

The first four years should see the MLC under the tutelage of the Center For Learning and Development, the director of which should have a veto over all of its actions, including hiring and firing and budget. Every educational experiment should have a father until it grows up.

Central Administration Policy

The concept of a learning system I have developed here presents the university with several difficult problems.

1. How do you superimpose on the present credit system a special credit system where partial credits are recorded at the time they are earned and can be accumulated as fast as the student cares to master the material? However, if the banks can accept deposits in cent units every workday of the year, while keeping tens of thousands of accounts straight, I don't think the management problems involved in the proposed credit system are too much for McGill to cope with.

2. What do you say in course catalogues when their are no courses, only information packages? How do you handle a Center that requires no time table decisions? How do you assemble degrees out of packages rather than out of courses?

3. How do you sell to the university at large the idea of a consumer market in information? When the MLC is established a student will be able to get mathematical credit from either the MLC or the Mathematics Department. Why do I have the feeling that the majority of our professors would react to a free information market about like a Moscow bureaucrat would react to capitalism?

Back In The Kingdom

There we are. Learning systems engineering, which I have imported from the Southern Empire, gives compelling reasons for introducing the MLC. Civilized management practice tells us that the MLC will present no management difficulties.

But how will my brothers accept the idea of a peasant who stands tall and no longer looks like an ox? I don't know. I'm curious to find out. Right now I'm relaxing by the fire, unarmed, admiring the tapestries.

Mr. Kingsbury is a lecturer in the Department of Mathematics, McGill.

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Genesis 2

an epic drama
auditions for actors
amateurs preferred
bilingual
or learning French if English
McGill union room 327
Saturday, November 15
1 p.m. to 5 p.m.

Erratum

The October 31 issue of the *McGill Reporter,* (Volume 2, Number 7), carried an item concerning Montreal Community Radio under the headline "Actions of the Board of Governors," (in *News Briefs*) which inaccurately stated that the "Board agreed to give Radio McGill $152,000." The statement should have read $50,700. This amount was granted as a o*ne time* gift.

INSTRUCTIONAL INNOVATIONS IN HIGHER EDUCATION

CENTRE FOR LEARNING AND DEVELOPMENT

The Center for Learning and Development was created to improve learning and teaching at McGill University. One of its main responsibilities lies in the implementation of instructional change throughout the university, and especially in the large undergraduate classes which show the most urgent need for critical analysis and innovation. The Centre is therefore sponsoring a conference entitled "Instructional Innovations in Higher Education," to be held in the Palmer Howard Theatre (McIntyre Medical Bldg.) from November 19 to 22.

There now exist means of overcoming the difficulties associated with mass enrollment and of further facilitating meaningful learning. The Centre, in organizing next week's conference, has aimed at introducing to the campus some of these innovations, in particular those which have been tried out elsewhere and have been proved successful. Many of the presentations deal with the problem of the large classes and offer alternatives to the traditional lecture method. These improvements are exciting in the fact that they enliven the whole learning process and permit an enhanced satisfaction on the part of the professor. Here is the complete outline of the conference:

WEDNESDAY, NOVEMBER 19

8:00 p.m. *Crisis in Higher Education,* Welcome and Introduction: Dr. H. Rocke Robertson, Principal, McGill University; Dr. Harold Taylor, Educator and Author, "Students Without Teachers."

THURSDAY, NOVEMBER 20

9:00 a.m. *Innovations and Experiments in the Classroom,* Dr. Andrew Ahlgren, Harvard University, "Harvard Project Physics: A New Means for Learning Flexibility"; Dr. Richard Malott, Western Michigan University, "Applications of Contigency Management, I. An Introductory Psychology Course for 1000 Students, II. A Pilot Study for an Experimental College."

11:00 a.m.: Dr. Robert Hurst, Purdue University, "The Audio-Tutorial Method: Individualizing Instruction in Biology"; Dr. Jack Michael, Western Michigan University, "A Behavioural Analysis of College Instruction: Elementary Statistics and Psychology."

2:00 p.m.: *Research Contributions to the Improvement of Learning,* Dr. Wilbert McKeachie, University of Michigan, "Empirical Analysis and Comparison of Different Teaching and Learning Methods."

3:30 p.m.: Dr. Gary Anderson, CLD, "The Significance of Classroom Social Climate for Student Learning"; Dr. Marcel Goldschmid, CLD, "Instructional Options: Adapting the Large University Course to Individual Difference"; Dr. Gale Roid, CLD, "Some Methods for Individualizing Instruction"; Dr. Charles Pascal, CLD, "Alternatives to Traditional Grading Procedures; Research Findings and Implications."

FRIDAY, NOVEMBER 21

9:00 a.m.: *Engineering a Learning System,* Dr. Thomas F. Gilbert, Praxis Corporation, "Mathetics: The Technology of Education."

10:30 a.m.: Dr. Thomas F. Gilbert, "Mathetics Workshop."

2:00 p.m.: Mr. D. Kingsbury, Department of Mathematics, "A Mathematics Learning Centre."

3:30 p.m.: *Multi-Media Approaches in the University Classroom,* Dr. Warren Seibert, University of Michigan, "Research on Audio-Visual Approaches in the Classroom"; Mr. William Hillgartner, Instructional Communications Centre, "Electronic Classrooms"; Dr. André Hone, Ecole Polytechnique, Université de Montréal, "Experiments on the Use of Television in the Classroom."

SATURDAY, NOVEMBER 22

10:00 a.m.: *Programmed Learning Models,* Dr. G. d'Ombrain, Faculty of Engineering, "Technological Aids to Creative Thought: McGill-Harvard Project TACT."

11:30 a.m.: *Identifying the Instructional Problem,* Dr. George Geis, University of Michigan, "To Teach or Not to Teach."

2:00 p.m.: *Strategies for Change,* Dr. Michael Oliver, Vice-Principal, "The Payoff for Instructional Reform." Panel of Discussants: Mr. Robert Hajaly, Former Student Society President; Mr. Donald Kingsbury, Department of Mathematics; Mr. Roger Morin, Post-Graduate Students Society; Dr. Hugh Scott, Faculty of Medicine; Mr. Martin Shapiro, Student's Society, Vice-President (External); Dr. William Westley, Department of Sociology.

FEEDBACK

FEEDBACK WELCOMES OPINION FROM ITS READERS, ON AND OFF CAMPUS. LETTERS SHOULD BE SHORT, MAXIMUM OF 500 WORDS.

Is the aesthetic dead?

The other day, attracted by the orange square and modernly silhouetted caricatures on your Halloween issue, I dared to read the article on education. I was engrossed and agonized. I turned the page and began to read the article on geography research but the light seemed to fade from the page. Why are the pages of the *Reporter* so drab?

I am not criticizing the new format. On the contrary, I think it has infinite possibilities; the headings and first letters of articles can be designed in fancy print and colour, articles can be printed over works of art so that the reader is not only enlightened but also aesthetically gratified, stripes of colour can be printed horizontally across pages, the borders can be designed, etc. Doesn't anybody have any imagination? Is the aesthetic dead?

Joanne E. Woods

ASUS: "we're warned"

I would like to congratulate Mr. Harvey Mayne for his article on Arts and Science.

This article was the first I have seen on the campus which more than scratched the surface of ASUS politics. Perhaps, with information available to them, members of the community who 'til now have been puzzled will understand the serious reservations many students who desired greater representation had about such representation coming through ASUS.

Mr. Mayne was serious and he was factual. It was the facts and not any editorializing which have impressed me and many others I spoke with.

There is even more to be said about ASUS. Black Panther conferences, uniligualist outbursts, are only a few things that have livened up their program. They should be discussed.

If ASUS as now constituted is given more and more responsibility, serious trouble may result.

Thanks to the *Reporter*, no one can claim "we were not warned."

Julius Grey,
President,
Students' Society

ASUS article attacked

Somehow I feel compelled to reply to the slanderous statements made by Mr. Harvey Mayne in last week's issue of the *McGill Reporter,* concerning the Faculty of Arts and Science and The Arts and Science Undergraduate Society. I attempted at first to ignore the charges, but they are so gross that they deserve full and considered reply.

To faciliate a response, I will answer the charges as I see them one by one:

1. That the ASUS Open Meeting calling for a vote on the proposals of the Joint Working Group was hastily called and poorly attended. The Joint Working Group was demanded by the ASUS at well-attended Open Meetings last year. Its terms require that it be referred back to the Faculty and the ASUS. This could have been accomplished by a vote of the ASUS Executive, but the latter chose instead to refer it to an Open Meeting. *The reason why only 25 students attended, as opposed to the normal 150-200 turnout, is quite simply that the* Daily *did not appear on campus till the late afternoon that day.* This was cited at the Open Meeting as a reason for which the gathering could not in all reason discuss the Joint Working Group proposals. It was therefore proposed that the proposals, which were printed in the *McGill Free Press* be put to a referendum. The vote was announced some three weeks in advance.

2. Students' Society President Julius Grey's opposition to the Joint Working Group.
The "serious misspelling" he refers to is that the second question read: "Report" instead of "Report's." Moreover, Mr. Grey wrote both the Dean and the ASUS President complaining that *he* was not a member of Faculty by the terms of the Report.

3. The turnout was low.
Turnouts are always low. The vote was held at the same time as a Students' Society by-election for Arts and Science Students' Councillor, at which time I was elected. A thousand students voted, about 1/6 those eligible. By comparison, in comparable by-elections in past years, 300, 600, and 500 people voted. The Joint Working Group Report was an issue in the election.

4. Some faculty members, of a supposedly conservative bent, stay away from Faculty

meetings because of a fear of "physical" action by student radicals.
The Meeting at which the main body of the Joint Working Group was adopted by the Faculty was adopted was attended by about 175 members of Faculty, the highest attendance ever. By comparison, 30 to 50 faculty members normally attend meetings. At the first Meeting, about *ten* students were present. At the last one, there were only *two*, excluding reporters.

5. The "unrepresentative" nature of the ASUS Executive Applications Committee.
It has appointed students to only *two* Faculty Committees. Almost all the people appointed were those who sat last year. Last year four students applied for the four positions on the Committee on Promotions and Standings, and all were appointed. This year a few more applied than were seats available. This year a few more applied than were seats available, and the executive applications board always tries to seat interested students applying for one committee, but who are rejected, on others where positions are available.

6. Mr. Mayne states, in part, my reply to Professor Leblond's criticism of the mechanism, which he addressed to the Students' Society Executive Applications Board.
The fact is that all Meetings of the ASUS Executive Applications Board are open, and, where the *Daily* sees fit to meet its advertising commitments and come out on time, advertised. The gross irregularities in the procedure on the Students' Society level have not materialized in the ASUS because Meetings are open, because to date students have been seated on only two Faculty Committees, and the Committee always attempts to get interested students involved on one Committee, if not the other. *Anyone* can attend Executive Applications Board Meetings. Mr. Mayne has never bothered to.

7. That the majority of students sitting on Faculty will be selected by Executive Applications.
There are thirty-seven students on Faculty. Twelve are directly elected for this purpose, six from Arts and six from Science. In addition, the Report recommends that the *elected* members of the ASUS Executive (there are only some twelve members of the Executive at the present time; the balance will be distributed on a more broadly-based ASUS Executive, which requires amendments to the ASUS Constitution. If the Students' Society Constitution adopted last spring were to come into effect now, this would mean, that as of January 1st, only four of thirty-seven students would be appointed, and this on a *temporary* basis).

Students appointed by the Executive Applications Board this month will sit only until January 1st, which involves, at the most, two Faculty Meetings.

8. The small turnout in ASUS Elections.
This is not true. ASUS Elections for Executive Officers, Students' Councillors and Class Representatives, save for by-elections, coincide with those of the Students' Society. The fact is that two years ago more people voted for ASUS president in arts and science than the number of arts and science students voting at the same time for Students' Society president, and that last year, the number was almost identical.

9. That the Executive gets acclaimed.
This is not true. Of the nine voting members of the Present Executive, two were acclaimed. By comparison, at least five of the present members of Students' Council were acclaimed.

10. His bit of dirt about the manner in which a vending contract was awarded last year.
Firstly, it requires approval of both the Arts and Science and Commerce Undergraduate Societies. Secondly, it was I as President of the ASUS Executive last year who asked members to list what could by the wildest stretches of the imagination be considered conflicts of interest" related to one outfit *which did not* get the contract. By comparison, none was involved in the outfit which was finally granted the franchise.

11. My supposed published remarks regarding the Arts and Science Selection Committee last year.
I never stated in the *Daily* that "the new Dean had been chosen because he had supported student demands for representation as chairman of the Joint Working Group." One has only to look at the composition of that selection committee to make a judgment on this statement. Secondly, what I did state was something to the effect that those who won the student preference poll, in which half the students of Arts and Science voted, didn't have a chance after that. This was an observation previously published in the *McGill News*, to which no objections have ever been made. Secondly, it was an observation made as to the state of academic politics in the faculty at the time, which Professor Maitre knows damn well, having been a part of the whole mess.

12. Most of his accusations stem from the unnamed student "politician." He seems ready to name everyone else *but* him.

I trust that this letter will be given prominence equal to that of Mr. Mayne's slanders, and that you, as Editor, will recognize, on the basis of the *facts* cited herein, the unfounded basis, distorted intentions and absolute lies of Mr. Mayne's article.

Yours sincerely,
Paul Wong
Students' Councillor
Arts and Science

Chaudhuri at McGill

The letter written by J.N.Chaudhuri to confuse the issues concerning his appointment at McGill reveals exactly the interests he represents.

The General cites the example of the coup in Ghana as a positive step in the "negative" role of the military. The overthrow of Nkrumah, a nationalist who opposed US imperialism, and the subsequent restoration of "democratic" government is a positive step in Chaudhuri's eyes. He further states that he has no intention of suppressing this "negative side" of his research. He has even offered to teach counter-insurgency techniques, on which he considers himself an expert.

To understand the implications of his research it is essential to examine his resources. The Centre for Developing Area Studies, where he is employed, gets four-fifths of its funds from US monopoly capitalists like the Ford Foundation. Small sums are received from firms like Dow Chemical, Noranda Mines, Consolidated Paper, etc., and McGill puts in almost another fifth. Centres like these (which exist all over America) have a vested interest in conducting research to suit their financers. The financers of the CDAS are the same ones who are exploiting the nations of Latin America, Africa, and Asia. A student editor in Harvard recently wrote, "The only reason I wouldn't blow up the Centre for International Affairs is that I might get caught."

Chaudhuri mentions his 42 years of service. That means his activities began in 1927, and since he was then in the British Army which was used to maintain a colonial rule, he feels honoured for this service. Furthermore, he implies that his attitude has not changed since the British left India—which means he is proud of having continued his earlier practices. Nobody has to cook up charges against him. His record shows "who is who's stooge."

Chaudhuri's concept of the military's role is showing how it has helped to solve imaginary problems of caste, race, and eating taboos. The Indian soldier is usually a villager kept on a very tight leash. As long as martial law dominates him, it doesn't matter whether one orders in English or Japanese. Once he leaves the Army he again faces the fundamental problems of economic exploitation. Is Chaudhuri saying that military discipline has solved these "problems"?

These "sacred cow" problems of caste and so on are constantly raised by western "experts" to cloud the real causes of oppression. Elitists like Chaudhuri help to reinforce these myths by coming here and spouting about them. The problem in India is mainly rural and one of exploitation by a ruling class alienated from the villagers and the urban labourers. Western countries like the US maintain these ruling people because they profit from the situation (60% of the Indian currency is in the hands of the Americans). Chaudhuri belongs to this ruling class, and inasmuch as his whitewash of western myths is concerned, he is a most pronounced "lackey" of Americans.

As far as the Indian Army and its alleviation of famines is concerned, it should be pointed out that on the contrary, the Army has very often been a cause of such tragedies. A case in point was the Bengal famine, during which even government offices admitted that the reason for not transporting grain in time was that the railways were bogged down by military traffic. The province of Rajesthan has been undergoing famine for months now. All that the Army has done in floods and famines is to roll in after the tragedy, count the bodies, and fill the sandbags.

Various apologists have excused Chaudhuri's appointment in the interest of "academic freedom." Apparently they feel that anyone should be allowed to do whatever he likes in the university. Considering the interests that the CDAS serves, and with its tendency of appointing yes-boys to give their statements some legitimacy, such "freedom" is inexcusable. It makes no difference whether Chaudhuri is here for two years or two days. Nor does one have to wait until he publishes something to realise that his activities can only be detrimental to the people of Asia and Africa. Academic appointments of this brand are criminal. That is why the CDAS should be abolished and Chaudhuri must go.

The nations of Asia have not yet evolved a role for the military themselves. Trying to define this role from the other side of the world in such a situation only means that the roles defined will not serve the interests of any national liberation struggle as long as imperialism exists. McGill has a history of instituting studies to serve colonial interests.

Devinder Garewal,
McConnell Engineering Building

The Hockey Scene at McGill

With the opening of a new hockey season at McGill, a few new twists have been added around campus to give our sports picture new life: specifically, the recently formed "Friends of McGill Hockey" association. This group is

made up of alumni and community members interested in sports, especially hockey, at McGill. Now about fifty strong, the membership includes such well-known sports personalities as Dick Irvin, Brian O'Neil, and Sam Etchevery, to name a few.

The official aims of the group can be summarized as trying to improve the caliber of McGill's hockey team(s) by helping in recruiting promising players, by fostering interest among students, faculty, and administration, and by working with other organizations in order to develop athletic programs at McGill.

The members keep abreast of developments in the off-season by means of a regular newsletter while the hockey season sees, naturally, a much more active program planned.

As soon as the ice hardened at the Winter Stadium, Wednesday evenings saw the "Friends" take the opportunity to do a little skating themselves. This more "active" group consists of former hockey players, football players, and other athletes from McGill and elsewhere. However, this is by no means the only activity on this year's agenda. Starting with the first home game on Saturday November 15, there will be special facilities at the Winter Stadium for "Friends" and friends to have coffee and to warm themselves. As well on the 15th, there will be a pre-game reception for graduates and interested fans, to acquaint or re-acquaint themselves with the "Friends" and the current hockey scene at McGill. More of these receptions, along the lines of those held before the Saturday football games, are in the planning stage and will hopefully materialize. These will not be restricted to home games but will also be held in those cities where there is a large contingent of McGill alumni. As of now, only Quebec City is also to be the site of such a reception when the Redmen travel to the capital to play the Laval Rouge et Or.

The last main function of the organization is in the field of recruiting. Being in existence less than a year means, of course, that no real recruiting network has yet been set up. However, in close cooperation with coach Brian Gilmour, the Friends of McGill Hockey are trying to attract high school hockey players to McGill. They will be hosting a Parent-Son night at McGill during the winter as well as giving interested out-of-town players a first hand look at the campus and athletic facilities.

Not restricting themselves to alumni and other non-undergraduate hockey fans, the "Friends" are working with the Student's Athletic Council to organize activities to stimulate interest among the student body itself. The home opener will see the crowning of Miss Redmen—the first time such an honour has been made available. As well there will be extensive coverage of the Redmen season in the *Daily* and other campus media.

For anybody who might be interested in the "Friends of McGill Hockey" let me repeat that membership is not restricted to McGill alumni. Anybody who wants to see hockey up-graded at McGill is extremely welcome. Further information can be obtained from the President, Dr. Albert (Whitey) Schutz or Coach Brian Gilmour in the Athletics office.

Very sincerely,
Michael Kazakoff

Clarifications on "Physics Profile"

I would like to make a few comments on the article, "Physics Department Profile," which appeared in a recent issue of the *McGill Reporter.*

In particular there is a point with regard to "service departments" that should be elucidated. In the Faculty of Arts and Science there are twenty-seven departments and in the Faculty of Engineering there are six departments. Of these thirty-three departments there are four, of which Physics is one, that offer courses mandatory to First Year students. (I speak of the situation which obtained at the time the profile was prepared, and matters have not changed greatly in the interim.) Indeed a glance at the Calendars reveals that about four fifths of the courses prescribed for First Year students in Science and in Engineering are given by these four departments. A number of the other departments give no courses at all to First Year students. It is a large component of work with First Year students. A tabulation of enrolment in all courses of the Faculty of Arts and Science issued annually by the Dean's Office confirms this. In the four departments referred to, from one third to one half of the total undergraduate registration is in First Year courses and about 70% to 80% is in First and Second Year courses. This is the normal condition in departments that serve the needs of First Year students. The situation is very different in departments which have not hitherto had the opportunity of meeting First Year students.

I hope, Mr. Editor, that the foregoing elaboration may be helpful in supplying a perspective which was lacking in the profile as published.

With regard to the question of students being identified with a single department, Faculty regulations require that all B.Sc. students in their First Year and that all non-Major General degree B.Sc. students in their *first three years* shall take courses in *four* different departments. To which department do these students "belong"? Major and Honours students from the beginning of their Second Year of course are identified with one or two departments. It is a further requirement that all General degree courses be open to all students with pre-requisites. The result is that in our First Year classes and in some of our Second and Third Year classes the majority of students are not solely or even primarily concerned with one department, be it Physics or another. To say these things is not to express an opinion, much less is it to proclaim disinterest. Rather it is simply to state facts. My *opinion* is one of regret that a large fraction of students, sometimes estimated at 50%, are not registered as Majors or Honours in *any* department.

I turn now to a brief remark on the impact of Cegeps on University education. To say that Cegeps adds a year at the bottom would imply that it would take the student a year longer to reach the same destination. A year at the top would mean that the student would have to proceed one year beyond the level at present required before gaining his degree. In the area of the University with which I am most familiar the situation is that the student who has completed Cegeps (or E2, as we call it) will have had about 50% more Mathematics, Physics and Chemistry than the pre-Cegeps student at the end of B.Sc. 1. At the same time he will have had two and one half electives at his disposal in place of one elective. But he will by no means be ready for his penultimate degree-year. To say that Cegeps is neither a year at the bottom nor a year at the top but half and half is, again, a simple statement of fact. If I may now express an opinion it would be that the advent of Cegeps affords students and Faculty an opportunity to plan better programs than we have ever had before.

The phrase "almost half the approximately 60 members of staff are post-doctoral fellows and associates involved mainly in research ("assisted by graduate students" which is your phrase, not mine), requires clarification. The number of academic staff in the Department at the time the profile was prepared was 38. There were 20 post-doctoral fellows or research associates. These latter personnel are not paid from the general funds of the University but from research funds granted to members of staff in aid of their research. Post-doctoral fellows and research associates do no teaching nor do they take courses. In general their appointments run for a year or two. Commonly a person obtains his doctorate at one institution, spends his post-doctoral time at a second and then takes up an academic or research post at a third. These personnel are not normally classed as academic staff. Nor is it the role of graduate students to assist them in their research. Thus your phrase quoted above is grossly misleading in addition to being numerically incorrect.

I would like to point out that members of the academic staff of the Department have over the years contributed notably to the whole work of the University and to the educational and scientific life of the Province and the country. Groups working within the Department or jointly with other departments are deeply involved with ice research and with meteorological research and services. We have the only high intensity magnetic field laboratory in Canada. We have one of the three groups in Canada engaged in high energy physics. And we have continuing programs in nuclear physics, solid state physics and in many aspects of theoretical physics.

May I suggest, Sir, means whereby I believe "profile" could be improved? In this I do not mean to criticize your colleague. On the contrary I believe he has been given an assignment which is unfair to him. I myself would not think of approaching the Chairman of an unrelated department and then, on the basis of notes jotted down during a brief interview, publishing a profile purporting to be balanced and informative, without even referring back for checking clarity and accuracy. I suggest therefore that for future projects of this kind two staff writers be assigned at least one of whom shall have had previous background knowledge of the department or of kindred disciplines. I suggest further that they seek more than one interview with the Chairman and that they make every effort to ensure that the whole work of the department is fairly represented. It is not an easy task but it is worth the effort to make these profiles more illuminating and less likely to reinforce pre-existing bias or prejudice.

With best wishes,
W.M. Martin,
Department of Physics

Editor's Note: The author of the article mentioned above, Harvey Mayne, spent the best of two weeks interviewing numerous faculty members and students in the Physics Department. At least an equal amount of time was consumed in researching various documents put out by the Department's institutes and groups. The article in question served as a general introduction to a series of profiles on the activities, research, and plans of a variety of sectors in the Department of Physics. Further articles will be appearing in the *Reporter* during this academic session.

COMING EVENTS

NOVEMBER 14 TO NOVEMBER 21

Send notices of coming events, photographs, illustrations, etc., to M. Cowen, Information Office, Administration Building, Room 633, McGill (392-5301, -5306). Deadline: Friday noon, a week before the issue in which the notice is to appear.

FRIDAY—14

HOMAGE TO HUMPHREY BOGART: at the Cinematheque Canadienne. Showing at 7:30 p.m. BIG CITY BLUES directed by Mervyn LeRoy (USA 1932), and at 9:30 p.m. THREE ON A MATCH by the same director. Bibliothèque Nationale du Quebec, 1700 St-Denis, entrée sud, tel. 844-8734.

FACULTY FRIDAY SERIES: The McGill Faculty of Music presents a Violin and Piano Recital by

Duo: Otto and Marie-Paule Armin. 8:30 p.m., Redpath Hall, admission: free.

FRIDAY NIGHT CINEMA: McGill Film Society's INTERNATIONAL 35 will present INDEPENDENT CINEMA, "A selection of the best of recent films made by student, overground and underground independent producers," 6:00 p.m., 9:00 p.m., Leacock 132.

INSTANTHEATRE presents PLAY by Samuel Beckett, starring Denise Huot, Victoria Mitchell, and David Schurmann. 12:15 and 1:15 p.m., Place Ville Marie, admission: $1.25; Students $1.00.

LECTURE IN EDUCATIONAL TECHNOLOGY by Dr. F.B. Rainsberry, Ontario Institute for Studies in Education, Toronto. Topic: "Curriculum Development through Media," 8:15 p.m., Room H-635, Hall Building, SGWU.

NATIONAL THEATRE SCHOOL OF CANADA: The school's third year English students present ANOTHER PART OF THE FOREST by Lillian Hellman. 8:30 p.m., Nov. 14 and 15, Monument National, 1182 St. Lawrence Blvd., admission: free.

A scene from ***le socrate,*** *McGill Film Society's Friday Night Cinema offering, 21st, L132, 6:30 and 9.*

PAINTING EXHIBIT: The Post-Graduate Students' Society present an exhibition of the works of artist Ahmed Yar Khan until November 24th, 4:00 to 12:00 p.m. daily in the Grad Centre, 3650 McTavish.

PLASTIC ROSELAND DANCE EMPORIUM, THE SIXTH PATRIARCH'S SENSORY DINNER and THRILL SUTRA: Sponsored by the American Deserters' Committee and the February 11 Defence Fund. 5:00 p.m. to 1:00 a.m., McGill Student Union Ballroom, 3480 McTavish, admission: $1.00. Info: 875-5510, ext. 43.

SANDWICH THEATRE: McGill Players present WOYZECK by Georg Büchner, directed by Ray Lukens (first performed in Munich in 1913). Through to November 19. 1:00 p.m., Union Theatre, admission: free.

VISITING PROFESSOR to the Department of Psychiatry, Dr. G.M. Carstairs, will hold informal discussion this morning; at 1:00 p.m. the J.G.H. Conference: "Ecological Studies of Suicide and Attempted Suicide," Allan Memorial Institute.

SATURDAY—15

INTERNATIONAL 35: McGill Film Society showing LOVE AFFAIR, directed by Dusan Makavejev (Yugoslavie 1967). "This film mixes trivia, horror, and human courage into a continuous half documentary, half fictional narrative." 6:00, 8:15, and 10:30 p.m. in the Physical Sciences Centre Auditorium.

MONTREAL MUSEUM OF FINE ARTS present a film on art: "Lismer: Painting a Province." 2:30 p.m., Lecture Hall, Sherbrooke St. W., admission: free.

MONDAY—17

LECTURE: The Classics Department's Visiting Professor, Antony Raubitschek. Professor of Classics, Stanford University will lecture on "Early Cretan Armour." This illustrated lecture will show helmets, corslets, and other decorated armour from Crete of the seventh century B.C. 8:15 p.m., Room West 215, Arts Building. Coffee will be served after the lecture. The public is invited.

MCGILL CHAMBER ORCHESTRA: Conductor: Alexander Brott; Guitarist: Alexander Lagoya, at Théâtre Port-Royal, Place des Arts, tel: 842-2112.

MEETING: Board of Governors, 4:00 p.m., Room 609, Administration Building.

MEETING: Council (Faculty of Arts and Science), 3:30 p.m., Arts Council Room.

SEMINAR: The Department of Political Science presents Professor L.A. Kellstedt, University of Illinois, Chicago Circle, topic: "Reflections on Research on Race and Poverty Problems in the Urban Environment," 2:00 p.m., Leacock Council Room.

SEMINAR: The Department of Epidemiology and Health's Departmental Seminar on "Epidemiological Studies of A2 (Hong Kong) Infection." 12:30 a.m., Room 217, Pathological Institute, New Wing, 3775 University Street.

SEMINARS ON HUMAN ECOLOGY: "From Community Plantation to Modern Industry Via Subsistence Agriculture and Cash-Cropping: Coffee Production and Changing Ecological Relationships in Eastern Venezuela," Professor J. Miller, Department of Anthropology; and "Cultural Causes of Qualitative Ecological Change: Cash Cropping and Industry for New Guineau Agriculturalists," Professor S. Salisbury, Department of Anthropology. 4:00 p.m. in Leacock 738.

SEMINAR: Marine Sciences Centre, Topic: "The Arctic Marine Vegetation: What is it and Where is it," Lecturer: Dr. Robert T. Wilce, Department of Botany, University of Massachusetts. 4:00 p.m. 772 Sherbrooke West, Room 502 (4th Floor).

TUESDAY—18

BOOK DISCUSSION GROUP: McGill Faculty Wives discuss the following books: *The Heart of Darkness*, by Joseph Conrad and *A Dying Colonialism*, by Frantz Fanon. 8:00 p.m., 21 Windsor, Westmount, info: 288-3968.

CLUB FRANCOPHONE DE MCGILL: Causerie instituée: "Fenêtre ouverte sur le monde de la culture française," par M. Paul Dumont-Frenette, Délégué aux relations publiques pour les réseaux français de Radio Canada. 8h. du soir, salon des Professeurs, Peterson Hall, 3460 rue McTavish.

HOMAGE TO HUMPHREY BOGART: Cinématheque Canadienne shows THE PETRIFIED FOREST, directed by Archie Mayo (USA 1936), with Bette Davis, 9:30 p.m. Also, CINEMA D'ANIMATION: L'animation d'aujourd'hui III, 7:30 p.m. Bibliothèque Nationale du Québec, 1700 St-Denis, entrée sud, tél: 844-8734.

MEETING: MAUT General Meeting, 4:00 p.m., Faculty Club Ballroom.

MONTREAL SYMPHONY ORCHESTRA: Program: Pendereckl, Schmidt, Dvorak. Cellist: Jacquelin Du Pré. Nov. 18 and 19, 8:30 p.m., Salle Wilfrid Pelletier, Place des Arts.

WEDNESDAY—19

HISTORIOGRAPHY COURSE: Professor H.C. Schlieper, on "History and Archeology," 7:00 to 8:00 p.m., Leacock 15.

HOMAGE TO HUMPHREY BOGART: Cinématheque Canadienne shows TWO AGAINST THE WORLD, directed by William McGann (USA 1936), 7:30 p.m. At 9:30 p.m., INDEPENDENT FILM MAKERS: Toronto. Bibliothèque Nationale du Québec, 1700 St-Denis, entrée sud, tél: 844-8734.

LOYOLA WEDNESDAY SILENT FILM SERIES: screening FOOLISH WIVES directed by Erich von Stroheim (USA 1922), 8:30 p.m., Vanier Auditorium, Loyola College, admission: 75¢.

MEETING: Physical Sciences—Division IV, 4:10 p.m., Room 102, Physics Bldg.

MEETING: Social Sciences—Division II, 4:10 p.m. in the Leacock Council Room.

MONTREAL MUSEUM OF FINE ARTS: Cinémuse Series, Theme: Man, Love and Death. Showing BLACK ORPHEUS, directed by Marcel Camus (Brazil, 1960). Also, EVERYTHING IS A NUMBER (Poland 1967), 8:00 p.m., Lecture Hall. The museum's "films on art" presents LANDSCAPE INTO ART III at 12:30 p.m., Lecture Hall, Sherbrooke St. W., admission: free.

NATIONAL MUSEUMS WEDNESDAY EVENING LECTURE SERIES: A lecture on "Embellissement du Milieu Urbain," by Dr. Yves Desmarais, Director du Jardin botanique de Montréal. 8:15 p.m., in the National Gallery Auditorium, Lorne Building, Elgin at Slater, Ottawa.

SEMINAR IN MECHANICS: Thermohydrodynamic Instabilities in Boiling Channels, by D. D'Arcy

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Survival U from page 5

(Advanced Projects and Reactor Physics Division, Atomic Energy of Canada), 4:00 p.m., Room 226, McConnell Engineering Building.

98¢ REVIVALS: McGill Student Entrepreneurial Agencies Inc. presents POOR COW starring Terence Stamp and Carol White, 6:30 and 9:00 p.m. in Leacock 132.

WEST INDIAN SOCIETY: discussion Series on the Caribbean. Tonight, Dr. Zin Henry, Visiting Professor in the Centre for Developing Area Studies: "The Caribbean—a Socio-economic Perspective." 7:30 p.m., Rooms 123, 124, McGill Student's Union, 3480 McTavish.

THURSDAY—20

LECTURE: Department of English. "The Allegorist and the Aesthetician," by Professor D.W. Robertson, Jr., Princeton University, 4:00 p.m. in Leacock Council Room.

MEETING: Biological Sciences—Division III, 4:10 p.m. Room S 3/6, Stewart Biology Building.

MEETING: Senate Academic Policy Committee, 2:30 p.m., Room 609, Administration Bldg.

MONTREAL MUSEUM OF FINE ARTS: Cinémuse Series, Theme: L'Homme pendant l'occupation. INNOCENCE SANS PROTECTION, Makavajev (Yougoslavie, 1968); LES DEUX PIGEONS, court métrage, René Claire (France, 1963), 8:00 p.m., Lecture Hall.

98¢ REVIVALS: McGill Student Entrepreneurial Agencies Inc. presents NIGHT AT THE OPERA, starring The Marx Brothers, 6:30 and 9:00 p.m. in Leacock 132.

FRIDAY—21

FRIDAY NIGHT CINEMA: The McGill Film Society presents LE SOCRATE, directed by Robert Lapoujade (France, 1968): "Probes intellectualism to reveal both absurd and profound facets." 6:30 and 9:00 p.m., Leacock 132.

HOMAGE TO HUMPHREY BOGART: Cinematheque Canadienne presents BULLETS OR BALLOTS, directed by William Keighley (USA 1936), at 7:30 p.m. Showing at 9:30 p.m. L'HOMME N'EST PAS UN OISEAU (Covek nije tica), directed by Dusan Makavejev (Yougoslavie 1965), Bibliothèque Nationale du Québec, 1700 St-Denis, entrée sud, tél: 844-8734.

MONTREAL MUSEUM OF FINE ARTS: Noel '69, "Exhibition of Christmas trees of many countries." To November 30, Sherbrooke St. W.

POETRY READING: Stan Persky and Gladys Hindmarch read poetry at SGWU, 9:00 p.m., Room 651, Hall Building, admission: free.

CHESS

by CAMILLE COUDARI

The chess column, by Camille Coudari, will not appear this week. Mr. Coudari is in New York, playing in the Empire City Open Chess Tournament. Last week's column, on chess as a philosophy, was the second of a series discussing the nature of chess; the first ought to have been on chess as a science. That column will appear next week, followed by chess as an art. The editors apologize for the mix-up.

MISS REYNOLDS TO RETIRE

Miss Helen C. Reynolds, Warden of Royal Victoria College since 1962, will leave McGill University August 31, 1970, when she will have reached statutory retirement age, it was learned this week.

In addition to her administrative duties, Miss Reynolds has been teaching in the department of chemistry. During her earlier years here, she taught first-year chemistry. More recently, she designed and has been teaching a course in chemistry for students in nursing, physiotherapy, and pre-medical arts.

Immediately upon her arrival at McGill, Miss Reynolds took over supervision of the construction and furnishing of the Roscoe Wing of RVC, named after her predecessor, Dr. Muriel V. Roscoe, which opened to its first residents in 1964.

Miss Reynolds has been serving at McGill during a period of great unrest and change. Under her guidance, the rules and regulations governing residents of RVC have undergone considerable liberalization. In her capacity as Warden, she continues to assist women students—both resident and non-resident—particularly in their academic problems.

Aside from serving as a member of Senate, Miss Reynolds has been a member of such important Senate committees as those governing Admissions, Scholarships, Promotions and Standing, as well as Residences.

She came to McGill from Dalhousie University, Halifax, after serving there as Dean of Women and Warden of Shirriff Hall for seven years.

A native of the Musqouidoboit Valley, Nova Scotia, she graduated from Dalhousie University with distinction in Mathematics and Science. She taught science for four years at Halifax Ladies College, and chemistry for 15 years at Havergal College, Toronto, where she also was director of extra-curricular activities.

In 1954-1955, she was president of the Science Section, Ontario Education Association, an organization of high school teachers, university professors, and science school inspectors.

Miss Reynolds plans to take up residence in Halifax upon her retirement.

that damages the forests of Scandinavia, why a well-meant farm subsidy can force millions of Negro tenants off the land and lead to Watts and Hough. A graduate who comprehends ecology will know how to look at "what is going on in the world," and he will be equipped to do something about it. Whether he ends up as a city planner, a politician, an enlightened engineer, a teacher, or a reporter, he will have had a relevant education. All of its parts will hang together in a coherent whole.

And if we can get enough such graduates, man and his environment may survive awhile longer, against all the odds.

McGill reporter

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The McGill Reporter has no editorial prejudice. It is open to contributions from anyone on any subject, and is responsible for presenting, concurrently or serially, a balance between points of view.

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